HAZELWOOD WEST FIELD EES
LA TROBE PLANNING SCHEME
AMENDMENT C32

FINAL PANEL REPORT

"Note

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March 2005

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FINAL PANEL REPORT

ROBIN SAUNDERS, CHAIR

GEOFF ANGUS, MEMBER

BOB EVANS, MEMBER

March 2005

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1. SUMMARY

Introduction

International Power Hazelwood (IPRH) presently wins coal from the Hazelwood mine to fuel their 1,600 MW Hazelwood Power Station, which contributes about 22% to 23% of Victoria's base load electricity. The project goal is to maintain an uninterrupted supply of coal to Hazelwood Power Station for the nominal commercial operating life of the business to 2031. Constraints (streams and roads) to the westward advance of the Hazelwood Mine coalface have led IPRH to pursue the development in two phases.

Phase 1 began in the West Field in 2001 under existing project approvals and provides access to sufficient coal to fuel the power station until 2009. The West Field Proposal is Phase 2 of the West Field development of Hazelwood mine, and entails:

- The diversion of the Morwell River (for the fifth time) to the west of its current course (the second diversion) and the diversion of Eel Hole Creek and Wilderness Creeks;
- Realignment of the Strzelecki Highway to the west of its current alignment between the Morwell–Thorpdale Road and the Princess Freeway, and other road improvements;
- The progressive opening up of the new mine with relocation of conveyor systems to transport the coal and the eventual closure and rehabilitation of the mine.

The EES provides a comprehensive review of all, save one, pertinent issues prior to statutory approvals, which include a Mining Licence and a Work Authority, Amendment C32 to the Latrobe Planning Scheme and four planning permits, EPA Works Approval and assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The sole issue not addressed in the EES is consideration of greenhouse gas emissions arising from the burning of coal from the Phase 2 of the West Field in the Hazelwood Power Station. This matter was specifically excluded from the Panels' Terms of Reference, and was not addressed in the first round of hearings. Subsequently, and following an appeal to the Victorian Civil and Administrative Tribunal (VCAT), Justice Stuart Morris directed that the Panel provide reasonable opportunity for submittors to the amendment to submit evidence, to have that evidence heard by the Panel, and that the Panel consider the impacts arising from the burning of Phase 2 coal in the Hazelwood Power Station in making its recommendations.

Accordingly, the Panel reconvened its scheduled hearings and has made its recommendations following consideration of the impacts on the anthropogenic greenhouse effect arising from the burning of brown coal in the Hazelwood Power Station.

The Panel has concluded that, as a direct consequence of Justice Stuart Morris' order, and contrary to the Minister's Terms of Reference, it must consider the impacts arising from the burning of brown coal from Phase 2 of the Hazelwood West Field Mine in the Hazelwood Power Station comprehensively in relation to all the approvals sought, to the extent that the emerging government policy, and the detailed information provided by the proponent and government, allows.

Some preliminary matters are addressed in Chapter 6 — insufficient time, failure of the planning authority to consider all submissions, and failure to appoint the Panel under the Water Act.

The Panel was impressed with the high quality of the EES, and IPRH's efforts to thoroughly examine issues relating to the proposal. The Panel commends IPRH for its openness, diligence and competence in providing information to the Panel to assist the Panel in coming to its conclusions.

The Panel believes it desirable for DPI to review the Guidelines for ERC's, particularly with reference to the ambit of their considerations, to clarify that ERC's can address off-site effects.

Future electricity needs and the most efficient use of brown coal

Given the lead-time for alternative technologies, the absence of significant demand management in an environment of low electricity prices, and the expected increase in annual electricity demand, the Panel concludes that the IPRH proposal for the West Field development is the most economical alternative for the supply of base load electricity to Victoria and the National Electricity Market.

Taking into consideration the current and future needs, the size of the brown coal resource, and the opportunity for increased efficiency from Hazelwood Power Station in the future, the Panel concludes that the proposal is an appropriate use of the Gippsland brown coal resource.

The river and road diversions

The Panel endorses the selection of Morwell River Diversion Number 5 (MRD5) by IPRH in favour of other possible river diversions. In relation to the mining method, the Panel accepts that it is presently economic to maintain the dredger operation, and notes that a shift to partial dozer operations is likely as new plant is required.

The location of MRD5 will be a constraint to any future development of the Driffield Coalfield over which HRL Developments Pty Ltd (HRL) has an exploration licence. The Panel concludes that it is entirely reasonable for IPRH to seek approval for the location of MRD5 and the relocation of the Strzelecki Highway in the manner set out in the EES. The mining legislation, the planning framework and past experience support the view that infrastructure can appropriately be sited on land covered by exploration licences held by third parties.

The Exploration Licences awarded to HRL do not confer on HRL any right to access to the coal within the tenements unfettered by infrastructure. A key principle in deciding who should pay the future costs for relocating infrastructure, including the future replacement of MRD5 (presuming it is constructed by IPRH in the next few years), is that costs should be borne by the parties to whom benefit accrues at the time of relocation.

With respect to the proposed MRD5 and the diversions of the Eel Hole and Wilderness Creeks, the Panel concludes that the location, design and construction processes are satisfactory. From an environmental point of view, the Panel is of the opinion that the proposal for the MRD5 is far superior to the currently operational MRD2 (which relies upon an underground drain for low level flows with minimal treatment of the flood way channel) and allowing for the fact that it will be 'man-made', it will be a reasonable facsimile of a natural water course.

The Panel generally accepts the alignment and configuration of the Strzelecki Highway deviation, and the proposals for re-routing over-dimensional vehicles, with minor suggested changes.

Environmental impacts

The Panel concludes that the work undertaken by IPRH, and by Biosis on its behalf, to investigate flora and fauna impacts, and to provide ameliorative measures, has met most reasonable expectations. The Panel notes that there will be ongoing discussions between IPRH and DSE to finalise the Net Gain offset requirements, as is the usual case following project approval. The Panel supports the negotiated agreement between IPRH and DSE for the undertaking of some limited additional fauna surveys.

The Panel concludes that the studies undertaken, and the Net Gain offsets to be finalised to the satisfaction of DSE, will satisfy the requirements of the Flora and Fauna Guarantee Act 1988, Victoria's Native Vegetation Management—A Framework for Action, and the controlling provisions of the EPBC Act which have been applied to the project (listed threatened species and communities).

IPRH have demonstrated the advantages of the current process of monitoring the performance of the operation of aquifer depressurisation in order to achieve the dual goals of operational safety and minimisation of aquifer extraction. This program must continue in a similar manner until the coal extraction process and the rehabilitation of the mine are complete. While ground water extraction is significant, there is only minimal (if any) impact on other users.

The modelling of dust has been based on discussions with the EPA to ensure that the modelling would meet the EPA's expectations in terms of methodology and comparison with a number of standards of air quality. The results show that dust is a potential problem at some residences relatively close to the construction activities in some years. Although the number of predicted exceedances of the PM_{10} intervention level is not high, these occurrences demonstrate the need for an effective dust control strategy.

The risk assessments performed for silica in dust, which is a causative factor for lung cancer and silicosis, have been thorough and convincing. On the basis of these risk assessments, the Panel concludes that the health impacts on neighbours and the general public are very unlikely to be significant or indeed measurable.

The Panel has some concerns about the background noise measurements and the methodology used in modelling future noise by IPRH's noise consultant. The use of excessively conservative data, eg noise from all equipment being under full load as input to the noise model, is not very convincing. The statement that because of the conservatism, the predicted noise levels are up to about 5 dBA seems to be a sweeping over simplification.

While the general outcome of the noise modelling is that noise is unlikely to be a serious nuisance to neighbours, this is not beyond doubt. For this reason the Panel's view is that the planned monitoring program for the West Field Project needs to be carefully considered. Further manned background measurements should be carried out at sites where exceedances are most likely (BG5, BG6 and BG7), and monitoring of noise arising from the construction and operations should be undertaken in response to complaints until sufficient experience is obtained to use professional judgement augmented by some measurements. Final details of

the additional background measurements and the frequency of monitoring measurements should be decided in consultation with EPA.

The assessment of greenhouse gas emissions from the construction of the road and river diversions and from coal mining has been adequately addressed in the EES in general, although some efficiency gains are still possible, especially with the pumping activities associated with the mine, which will continue till mine closure.

The potential increase in global temperature from emissions of greenhouse gases from the HPS are estimated to be up to between 0.00009◦C and 0.00027◦C in 2030. These increases, and their consequential effect on rainfall events, are still very small, if taken in isolation to other emissions world wide. An order-of-magnitude estimate of the discounted financial cost of the impacts of greenhouse gas emissions from HPS over the period 2011 to 2031 (and the effect of those gases in the global ecosystem for many years after that) compared to replacing HPS with a more greenhouse friendly option, might be of the order of $200 million.

Views relating to conditions of sale of HPS to IPR, the uncertainty of whether potential replacements to HPS would yield significant greenhouse advantages in the short to medium term, considerations of sovereign risk, and the likelihood of an emissions trading scheme being implemented at a national level in the medium term, differ substantially. The voluntary agreement between IPRH and government (the Deed) outlined in broad terms to the Panel appears to provide a reasonable way forward in the short term, and is supported by the Panel, subject to close specification of the relevant parameters, assurances that the finalised Deed will not compromise any future ETS or the continuation of the PEM(GGEE), and recommended monitoring and reporting arrangements.

The Panel concludes that IPRH have taken reasonable steps to ameliorate and manage the visual intrusion impacts of the proposal to an acceptable level.

To ensure the proper protocols relating to Aboriginal sites and heritage places are followed, these should be referenced as a condition in the relevant planning permit and the mine work plan.

Retention of jobs by the extension of the Hazelwood mine is a clear community priority. Closure of the Hazelwood power station and mine complex in 2009 would be likely to create a high level of unemployment in the Latrobe Valley. Sufficient time is required to develop alternative brown coal to electricity generation to enable the workforce to remain relatively constant.

In the long-term the mine void will become a lake. Flooding the mine needs to be done in a controlled and measured way over many years. There are, however, a number of significant uncertainties that need to be resolved before a mine closure plan and rehabilitation plan can be finalised. There is uncertainty about the hydraulic connection between the Morwell and Traralgon aquifers, which has implications for the stability of the mine. There is also uncertainty about ensuring the long-term drainage of water from the joints between the coal blocks to prevent collapse of the unmined coal batters. A further uncertainty is the choice of techniques and practices that will produce the best revegetation outcome for the rehabilitation of the Hazelwood mine.

These uncertainties are common to all the miners in the Latrobe Valley. Consequently there appears to be considerable advantages by the industry adopting a co-operative approach with DPI taking a coordinating role to assist in the resolution of the rehabilitation issues.

Environmental management and approvals

The proposed Planning Environmental Management Plan, renamed the Project Environmental Management Plan, will comprehensively detail the various requirements identified at the present stage of the project development, including the requirements for construction (Chapter 7, the CEMP) and operations (Chapter 8, the OEMP). It will evolve throughout the finalisation of the approval process, through detailed design, through the construction of the stream and road diversions, through the mine operation and through the rehabilitation of the mine. The document is a key reference source for the Planning Permit to construct the stream and road works, for the work plan(s) for the extension of the mine, and for the EPA Works Approval.

The Panel concludes that subject to the various recommendations made throughout the Panel Report, the impacts associated with the proposal have been properly considered, and in the main can be adequately ameliorated. Although there are some significant impacts which cannot be ameliorated, and some residual impacts after ameliorative measures, these are outweighed by the benefits to the State in terms of the significant contribution that Hazelwood Power Station will continue to make to Victoria's power supply, and the benefits to local economic activity, employment and social cohesion, particularly in those years before more energy efficient combustion technologies are put into commercial operation to better utilise the brown coal resource.

The Panel concludes that, providing a satisfactory negotiation on greenhouse gases is concluded, and consideration is given to the recommendations of the Panel that relate to the conditions for mining and ongoing management and monitoring being adopted in either the Mining Licence, the Work Plan or the PEMP as appropriate, the extended Mining Licence to be sought by IPRH can be issued.

The Panel concludes that Amendment C32 should be adopted and Planning Permits 04189, 04190, 04191 and 04192 should be granted, subject to any requirements flowing from the Minister's Assessment following consideration of the Panel Report and the conclusion of the separate process in relation to greenhouse gas emissions from HPS, and with minor amendment to the proposed conditions on 04190 relating to Net Gain and environmental management.

The Panel concludes that the issues raised by EPA can be accommodated in the Works Approval WA55174, and that the EPA should take into consideration the detailed conclusions and recommendations in Chapters 11, 14, 15, 16, 17, 20 and 21 relevant to the Works Approval.

The Panel concludes that the issue of a licence under the Water Act is not imminent. No evidence about it has been presented to the Panel, and hence the Panel is not in a position to make any findings or recommendations.

The Panel concludes that the requirements of Sections 130 and 133 of the EPBC Act, which require that the State must provide a notice stating that the impacts of other aspects of the proposal have been assessed to the greatest extent practicable, can be satisfied through a combination of consideration of the Panel's conclusions and recommendations, and the conclusion of the separate process on power station greenhouse gases.

2. THE PANEL PROCESS

2.1 THE PANEL

This Panel was appointed by the Minister for Planning on the 1 July 2004 pursuant to Section 9 of the Environment Effects Act 1978 to hold an inquiry into the environmental effects of the Hazelwood Coal Mine EES extension (commonly known as West Field Phase 2).

Subsequently the Panel was appointed under delegation on the 21 July 2004 pursuant to Sections 153 and 155 of the *Planning and Environment Act 1987* to hear and consider submissions in respect of Amendment C32 to the La Trobe Planning Scheme. This amendment is required to rezone land covered by the West Field Project to reflect the changes in use resulting from the project. Four planning permit applications were jointly exhibited to facilitate various matters associated with the International Power Hazelwood's West Field proposal, including the diversion of the Morwell River and Eel Hole and Wilderness Creeks, the deviation of the Strzelecki Highway, and the closure of a number of roads.

The planning authority is Latrobe City Council and the proponent is International Power Hazelwood (**IPRH)**.

The Panel consisted of:

- Chairperson: Robin Saunders
- Member: Geoff Angus
- Member: Bob Evans

2.2 TERMS OF REFERENCE

Terms of Reference for the Panel Inquiry for the West Field Project – Phase 2 of the Hazelwood Mine West Field Development under the Environment Effects Act 1978 and the Planning and Environment Act 1987 were issued by Mary Delahunty, MP, Minister for Planning on 1 June 2004.

A copy of the Terms of Reference is provided at Appendix A. The Terms of Reference were generally quite broad and enabling, with certain exceptions, namely:

- the exclusion of consideration of matters relating to greenhouse gas emissions from the Hazelwood Power Station, with the note that these matters are being addressed through a separate process;
- the direction to hold a Directions Hearing approximately two weeks from the close of exhibition of the EES, on 12 July 2004;
- that public hearings should commence within approximately two weeks of the Directions Hearing – 26 July 2004.

- The Panel is required to report to the Minister for Planning within six weeks of its last hearing date.

2.3 INITIAL HEARINGS, DIRECTIONS AND INSPECTIONS

A Directions Hearing was held on 12 July 2004 at Powerworks, Ridge Road, Morwell. A number of directions were made, and a copy of the Directions is provided at Appendix B1. The Directions related to the timing of the provision of Expert Witness Statements (generally by 19 July 2004), and sought additional advice on the issues of:

a) The more efficient use of brown coal;
b) Options for the river diversion;
c) Implications of issue (b) above on (a);
d) Coal winning methods;
e) Rehabilitation;
f) Environmental management;
g) A response to the Strategic Assessment Guidelines.

Subsequently Clayton Utz drew to the Panel's attention that the date set for expert witness reports and statements on behalf of HRL had been 3 August 2004, but this was not reflected in the written directions. The Panel confirmed that an oversight had been made, and that the date for the expert witness reports and statements on behalf of HRL was 3 August 2004.

Mr Barton Napier, Principal, Enesar Consulting Pty Ltd wrote to Planning Panels Victoria on 19 July 2004 requesting that date for the Earth Tech Expert Witness Statement be extended to 23 July, in order that issues raised in the DSE late submission (received by Enesar on 9 July 2004) could be addressed. This was agreed.

The Panel Hearings were held on 26, 27, 28, 29 & 30 July 2004 and 4, 6, 9, 11 & 13 August 2004 at Powerworks. A further Hearing was held on Friday 27 August, to provide an opportunity for the Panel to ask for any elaboration it might have concerning the voluminous responses to various questions asked by the Panel throughout the hearing. HRL also sought leave to provide further information on that date.

IPRH were a little concerned that the delay of two weeks would add to the time before the Panel report was submitted. The Panel sought to allay that concern by stating that it was their intention to complete the report by 4 October 2004.

The Panel members inspected the site and surrounding areas immediately following the conclusion of the Directions Hearing on 12 July 2004. Notice of the Panel's intention was provided to submitters. The inspection was undertaken from a small bus provided by IPRH, and a number of submitters took part in the inspection.

The Panel members also undertook an inspection of the Yallourn Energy Morwell River Diversion presently almost constructed through the Yallourn Open Cut, to gain a better appreciation of the scale of the diversion works.

2.4 INITIAL SUBMISSIONS

A list of all written submissions to the EES and Amendment C32 to the La Trobe Planning Scheme is included in Appendix C1.

The Panel has considered all written and oral submissions and all material presented to it in connection with this matter.

The Panel heard the parties listed in Table 1 below.

Table 1 Submitters at the Panel Hearing

Submitter	Represented By
The Department of Sustainability and Environment (**DSE**)	Mr Geoff Ralphs — Environment Assessment Process Mr Rolf Willig — Environmental issues Peter McHugh, Manager Flora and Fauna, Gippsland Region
International Power Hazelwood (**IPRH**)	Mr. Stephen Davis, Partner of the firm Mallesons Stephen Jaques, and Barton Napier, Principal of the firm Enesar Consulting Pty Ltd. They called the following witnesses: – Mr Dave Quinn, CEO IPRH – Mr Andrew Clarke, Matrix Planning Australia – Mr Ross Hardie, Earth Tech Engineering Pty Ltd – Dr Robert (Bob) Keller, R J Keller & Associates – Mr Gustaf Reutersward, Richard Heggie Associates Pty Ltd – Dr Graeme Ross, CAMM – Dr Roger Drew, Toxikos Pty Ltd (written statement only) – Mr Stephen Mueck, Biosis Research Pty Ltd – Mr Richard Polmear, IPRH – Mr Anthony Lane, Lane Consulting Pty Ltd – Mr Don Johnson, RTL – Dr Ross Gawler, McLennan Magasanik Associates (MMA) – Mr Tony Innocenzi, IPRH – Mr Steve Rieniets, IPRH – Dr Keith Orchison AM, Director, Coolibah Pty Ltd (by telephone link) – Ms Carmel Coyne, - Enesar Consulting Pty Ltd

Submitter	Represented By
West Gippsland Catchment Management Authority	Mr Geoff Hocking, CEO (written submission to the hearing) Mr Graeme Jackson, Manager, Flood Plain Management
Department of Primary Industries (**DPI**)	Mr Guy Hamilton, Development Manager Mr Roger Dawson
Latrobe City Council	Ms Elaine Wood, Planning Manager Mr Paul Buckley, Acting CEO
Environment Defenders Office	Mr Barnaby McIlrath Mr Darren Gladman Dr Mark Diesendorf, Director of the Sustainability Centre (by telephone link)
VicRoads	Mr David Gellion, Team Leader Planning Mr Paul Taylor, Manager Transport Safety Services Mr Joe Bechaz, Transport Safety officer, VicRoads Eastern Region
Environment Protection Authority (**EPA**)	Mr John Marsiglio
John Hehir	Mr John Hehir
Australian Power & Energy Ltd	Mr David Lea
Stanley Brown	Mr Stanley Brown
Gippsland Trades and Labour Council	Ms Julie Tyrrell Ms Valery Prokopiv Mr John Parker
Chris Fraser	Mr C J Fraser
George Phair	Mr George Phair
National Council of Women of Victoria	Dr Pat Phair, Environmental Adviser
Institute of Public Affairs	Mr Alan Moran
HRL Limited	Mr Tony Ferguson, Mr Ian Lonie, Clayton Utz assisted by Ms Sallyanne Everett, Special Counsel, who called: - Mr Ted Waghorne and Mr Glen Reinsch, GHD Pty Ltd - Dr Robert Gauton and Mr Kevin Duggan, BFP Consultants Pty Ltd - Mr Lewis Sayer, WSC Planning Pty Ltd - Dr Terry Johnson, HRL Developments Pty Ltd

Lorna Long, a community member on the Environmental Review Committee (**ERC**), attended throughout. Her interest on behalf of the ERC was appreciated by the Panel.

A list of the Exhibits (Expert Evidence, presentations and submissions) tendered during the Panel Hearing is provided at Appendix D.

In drafting its report, the Panel has freely used text provided in the EES and in submissions. Such usage has only been specifically acknowledged where it is desirable to source the material to a particular submitter.

3. WHAT IS PROPOSED?

3.1 THE SUBJECT SITE AND SURROUNDS

The site of the IPRH West Field Proposal is immediately to the west of the Hazelwood open cut brown coal mine. IPRH presently win coal from the mine to feed their 1,600 MW Hazelwood Power Station, which contributes about 22% to 23% of Victoria's base load electricity. To the north across the Princess Freeway lies the city of Morwell. To the northeast lies the Corridor Coalfield, and beyond that the Yallourn open cut. To the east across gently rising ground lies the Driffield Coalfield, and beyond that the Haunted Hills. To the south lies the township of Yinnar, and beyond that the Strzelecki Ranges. To the southeast is the Hazelwood Power Station, the Office Coalfield (overlain with ash ponds and overburden dumps) and further to the south the Hazelwood Cooling Pond.

The predominant land use in the area off the existing mines is broad acre farming, and little of the indigenous vegetation remains. The Morwell River runs from the south to the north across the proposed mine extension, in a man-made grass covered flood plain, with a low flow underground large concrete pipe below it. At the northern end of the river, IPRH have developed extensive wetlands. Wilderness Creek and Eel Hole Creek are tributaries of the Morwell River at the south east of the open cut. Other infrastructure in the area includes local roads and the Strzelecki Highway and a range of high voltage transmission lines. These features are shown in Figure 1 below.

Figure 1 View from above Yallourn Mine to the IPRH operation and the Strzelecki Range

3.2 NATURE OF THE PROPOSAL

The project goal is to maintain an uninterrupted supply of coal to Hazelwood Power Station for the nominal commercial operating life of the business to 2031. Constraints (streams and roads) to the westward advance of the Hazelwood Mine coalface have led IPRH to pursue the development in two phases.

Phase 1 began in the West Field in 2001 under existing project approvals and provides access to sufficient coal to fuel the power station until 2009. Phase 2 of the West Field development of Hazelwood mine is shown in Figure 2, and entails:

- the diversion of the Morwell River (for the fifth time) to the west of its current course (the second diversion);
- the diversion of Eel Hole Creek and Wilderness Creek;
- realignment of the Strzelecki Highway to the west of its current alignment between the Morwell–Thorpdale Road and the Princess Freeway;
- upgrading the Yinnar–Driffield Road to replace the section of Brodribb Road to be closed between Strzelecki Highway and Yinnar Road;
- the progressive opening up of the new mine with supporting conveyor systems to transport the coal;
- the eventual closure and rehabilitation of the mine.

3.3 THE EXHIBITED DOCUMENTS

3.3.1 THE EES

On 4 April 2003, following advice from the Victorian Minister for Energy Industries and Resources, the Victorian Minister for Planning advised IPRH that an EES would be required for the West Field Project. The EES consists of some 2,500 pages, including a Main Report of over 500 pages, and four Volumes containing 17 supporting studies. A Summary Report of 82 pages was also prepared and exhibited.

The purpose of the EES process is to provide information on which the various approvals for the project can be based, and to do this in an integrated manner so that the separate approvals are not made in isolation, but in a comprehensive understanding of the likely advantages and disadvantages of the proposal.

Under “Project Approvals” the EES details the following requirements:

- a Mining Licence (and the need for lifting the exemption on the issue of exploration and mining licences pursuant to Section 7(5) of the *Mineral Resources Development Act 1990)*; and a Work Authority prior to any work commencing;
- a licence to construct Stream Diversion Works under Section 67 of the *Water Act 1989*;
- Amendment C32 to the Latrobe Planning Scheme and four planning permits;
- EPA Works Approval;
- assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Figure 2 Proposed project features

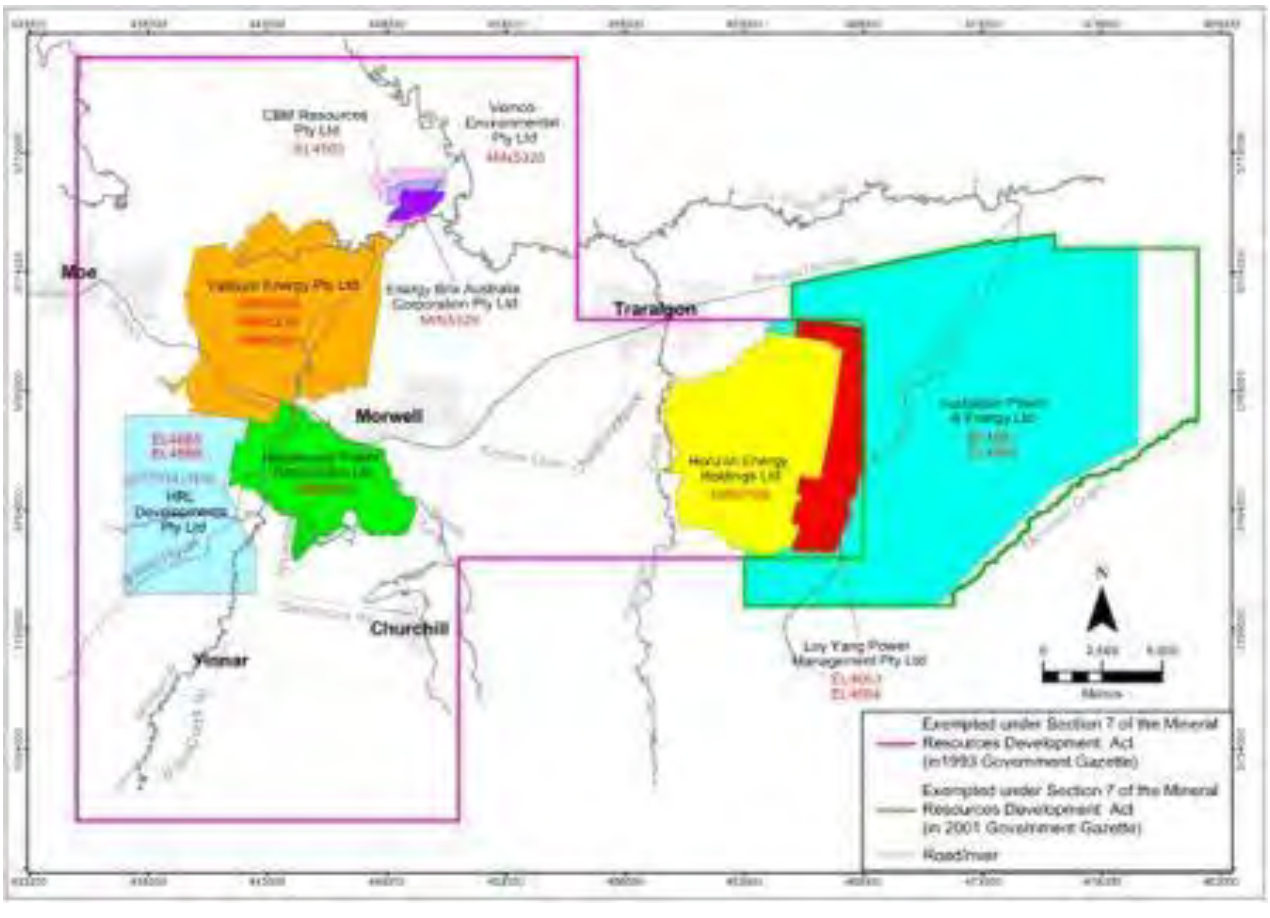
Other consents necessary prior to the commencement of works include:

- consent under the *Crown Lands (Reserves) Act 1978*;
- permits, if required, under the *Flora and Fauna Guarantee Act 1988*, the *Wildlife Act 1975*, the *Archaeological and Aboriginal Relics Preservation Act 1972* and the *Heritage Act 1995*;
- an agreement to a land exchange pursuant to the *Lands Act 1958* and the *Crown Land Reserve Act 1978*, and any necessary transfer of Crown land, required for the relocation of the Morwell River and Strzelecki Highway.

3.3.2 THE MINING LICENCE AND WORK AUTHORITY

In privatising the electricity industry, the Victorian Government exempted land shown in Figure 3 from being subject to an exploration licence or mining licence or both. The exemption was applied to ensure the State Planning Policy's requirements for orderly development of the brown coal resources are achieved. The area was extended in April 2001 as part of the Victorian Government's Brown Coal Tender initiative. Figure 3 shows the exempted areas, and existing mining and exploration licences in the region.

Figure 3 Existing tenements and land exempted from licence application



In August 2002 IPRH applied to the Minister for Energy Industries and Resources to lift the exemption over the proposed IPRH Mining Licence Application Area. Figure 4 shows the area of the existing IPRH Mining Licence (MIN5004) and the proposed IPRH Mining licence Application, and shows its spatial relationships with the abutting existing IPRH Mining Licence, the HRL Exploration Licence and the Yallourn Energy Pty Ltd Mining Licence

Figure 4 Exiting and proposed tenements (local)

No work can begin in a mining licence area (tenement) until a Work Authority is granted by DPI. Before granting a Work Authority DPI must be satisfied that the licensee has:

- an approved work plan;
- entered into a rehabilitation bond;
- obtained all other necessary consents;
- obtained the written consent of owners and occupiers of affected land, complete with any necessary compensation agreements.

It should be noted that the MRD Act prevents mining licences exceeding 260 ha unless the Minister decides otherwise. IPRH will, therefore seek four mining licences covering a total area of some 603 ha, and will subsequently consider amalgamating its licences. For simplicity, the Panel refers to the new licences to be sought as a single new licence.

3.3.3 THE AMENDMENT

The brown coal province is zoned “Special Use Zone 1 – Brown Coal” in the La Trobe Planning Scheme. As shown in Figure 5, a number of other zones and overlays apply to the area covered by the proposal. These include zones PUZ1, PPRZ, RDZ1and RDZ2, and overlay LSIO.

Within the SUZ1 zone, Mining (subject to Clause 52.08), Road, Minor utility installation, and Utility installation [other than Minor utility installation] (so long as it is directly associated with the mining, and has a 1000 metre buffer distance) are Section 1 uses, where a permit is not required. The West Field Phase 2 mining proposal is over 1000 metres from the nearest residential zone (Morwell).

Figure 5 La Trobe Planning Scheme – Current zones and overlays

Clause 52.08 Mining states that a permit is required to use or develop land for mining, unless either:

- An environment effects statement has been prepared under the Environment Effects Act 1978 and mining is exempt from the requirement to obtain a permit under Section 42 or Section 42A of the Mineral Resources Development Act 1990.
- The mining is in accordance with and within an area covered by a mining licence granted or Order made by the Governor in Council under Section 47A of the Electricity Industry Act 1993.

Amendment C32 is required to rezone land covered by the West Field Project to reflect the changes in use resulting from the proposed road and stream deviation works and the extension of the mine over the previous location of roads covered by Road Zone – Category 1 (RDZ1) and Road Zone – Category 2 (RDZ2). The amendment provides for removal of parts of the Land Subject to Inundation Overlay (LSIO) which the Fifth Diversion of the Morwell River will render unnecessary, the addition of a PAO2 in favour of VicRoads for acquisition of the Strzelecki Highway Deviation road reserve, and the addition of Road Closure Overlays (RXO) for a number of local roads which will be within the proposed West Field mine extension.

3.3.4 THE PLANNING PERMIT APPLICATIONS

Amendment C32 forms part of a joint planning scheme amendment and four applications for planning permits under Division 5 – Combined Permit and Amendment Process under the *Planning and Environment Act 1987*.

Planning permit application 04190 is for the construction of those parts of the Fifth Morwell River Diversion, the Wilderness Creek Diversion, and the Eel Hole Creek Diversion outside Mining Licence 5004 and the proposed Mining Licence.

Planning permit applications 04189, 04191 and 04192 are for subdivision of land to be acquired by IPRH for the West Field Project for the construction of the Strzelecki Highway Deviation, Fifth Morwell River Diversion and Eel Hole Creek Diversion (where only part of titles are required for the works).

3.3.5 THE EPA WORKS APPROVAL

Hazelwood Mine and Hazelwood Power Station are scheduled premises under the Environment Protection Act 1970, and mining activities are subject to EPA Licence EM30856. Hazelwood Mine discharges wastewater to the Morwell River under the terms and conditions of its licence.

EPA has determined that the West Field Project will require a works approval for the wastewater discharges associated with the construction of the road deviation and stream diversion works. To satisfy the Protocol for Environmental Management (Greenhouse Gas Emissions and Energy Efficiency in Industry), the works approval application incorporates an emissions inventory of the road deviation and stream diversion construction works.

3.3.6 OTHER APPROVALS

The most significant other approval is that required by the Commonwealth under the Environment Protection and Biodiversity Conservation Act 1999 (**EPBC Act**). A referral was

made by IPRH, particularly in relation to the Strzelecki gum, a listed threatened species under the EPBC Act. The delegate of the Commonwealth Minister for the Environment and Heritage declared the project a 'controlled action' citing Sections 18 and 18A (listed threatened species and communities) as the controlling actions. The Victorian EES process has been accredited as the required level of assessment under the EPBC Act (see EES Main Report Section 2.3.1).

3.3.7 EXHIBITION

The EES, the EPA Works Approval application No WA 55174, the preparation of Amendment C 32 to the La Trobe Planning Scheme, and Planning Permit applications numbers 04189, 04190, 04191and 04192 were jointly advertised in the Government Gazette on 13 May 2004, Latrobe Valley Express on 6 May 2004, the Herald Sun on 12 May 2004, and in The Age and the Weekend Australian on 8 May 2004. The closing date for submissions was 18 June 2004. Submissions were requested to be sent to Planning Panels Victoria, and advice was provided in the advertisement that copies of all submissions would be sent to IPRH, DSE, Latrobe City Council and EPA.

3.4 POWER STATION GREENHOUSE GASES

At the Directions Hearing on 12 July 2004, Counsel for HRL submitted that the Terms of Reference to the Panel wrongly exclude consideration of greenhouse gases produced at the power station through use of the coal from the West Field. Counsel for HRL argued that there is no provision for such a direction by the Minister in the Environment Effects Act, and it is contrary to the requirements of that Act, and to the requirements of the Planning and Environment Act.

Submissions to the Panel at the Directions Hearing by the Environment Defenders Office (Vic) Ltd (**EDO**) supported the views of HRL, and separately submitted that the Panel should consider the impact of greenhouse gases from the burning of brown coal from the proposed Phase 2 of the West Field Project mine extension.

The Terms of Reference issued by the Minister for Planning to the Panel state that:

> *"The Panel is not to consider matters related to greenhouse gas emissions from the Hazelwood Power Station – these issues are being addressed through a separate process."*

The Panel notes that the Terms of Reference do not imply that the greenhouse gas emissions from the power station are not relevant to the assessment of the proposal. Indeed, as the submission from the counsel to HRL states, the purpose of the proposal is to provide a continuing and uninterrupted supply of coal to the existing Hazelwood Power Station beyond 2009, to the end of the power station's commercial operating life to 2031. Additionally the justification for the project entails consideration of the detriment to the economic and social well being of the Latrobe Valley and Victoria if Hazelwood should be forced to close in 2009 for want of coal.

The Panel enquired what the "separate process" was. Mr Dave Quinn, CEO of IPRH, advised the Panel that he was involved in negotiation with the Minister for Energy, Industries and Resources on the issue, and this was confirmed by the representative of DPI.

The Panel took the view that what was essential was that before a comprehensive assessment of the West Field Project was completed, all the major issues surrounding it should be carefully considered. While one key issue was, by the Minister's Terms of Reference to the Panel, outside its purview, nevertheless a comprehensive assessment would be possible provided that the Minister, in making the assessment, took into account both the Panel's report and recommendations and the results of the separate process on the power station greenhouse gases.

The Panel advised the hearing of this view, and the parties agreed to take part in the hearing on this basis. It should be said that no undertakings were sought or given to prevent parties from exercising their rights with respect to the process.

3.5 APPEAL TO VCAT

On 20 August 2004 the EDO, acting for the Australian Conservation Foundation, World Wildlife Fund for Nature Australia, Environment Victoria and the Climate Action Network Australia, requested a determination under s.39 of the *Planning and Environment Act 1987* by the Victorian Civil and Administrative Tribunal. EDO submitted that the Panel failed to comply with the relevant provisions of the *Planning and Environment Act 1987*, and sought relief pursuant to s.39(4) of the *Planning and Environment Act 1987*. The relief sought included:

- A direction that the planning authority not adopt the amendment until the Panel provides a reasonable opportunity for the parties to bring forward evidence on the issue of greenhouse gas emissions from the Hazelwood Power Station, and then reconvene to hear and consider those submissions; and
- Declarations that the Panel failed to exercise its discretion under sections 168 and 161(1)(d)(i) of the *Planning and Environment Act 1987*, that the Panel is not bound by the Ministerial Terms of Reference to the extent that they purport to divert the Panel from its responsibilities under Divisions 1 and 2 of Part 2 and Part 8 of the *Planning and Environment Act 1987*, and that the Panel is bound to exercise its discretion to consider relevant evidence and other duties under these provisions, that the Panel has breached its duty under s.24 of the *Planning and Environment Act 1987* by failing to consider the Applicant's submission of greenhouse gases, and in doing so has denied the Applicant's natural justice, and therefore breached its duty under s.161(1)(b) of the *Planning and Environment Act 1987.*

A Directions Hearing was held by VCAT on 3 September 2004, and the matter was heard on 13 October 2004. The order by the VCAT President, Justice Stuart Morris, dated 29 October 2004, directed the Panel to provide opportunity for submittors to make submissions on the issue, and to hear those submissions and consider them in making its recommendations to the Planning Authority. Following a slips hearing held by Justice Morris to clarify aspects of his earlier decision, the Order was corrected to include the proponent (IPRH) and any authority.

The corrected decision is attached in full as Appendix E.

3.6 FURTHER EXHIBITION AND RECONVENED HEARINGS

The consequential actions taken in response to the order by Justice Morris were:

- Planning Panels Victoria sent a letter (dated 25 November 2004) to all 570 submittors, inviting further submissions on the issue of greenhouse gas emissions from the power station arising from the burning of brown coal from Phase 2 of the Hazelwood Mine. Such written submissions were requested to be submitted by 13 December 2004. The letter advised of a further Directions Hearing on Friday 17 December 2004.
- Further submissions were received, and these are listed in Appendix C2.
- The Directions Hearing was held on 17 December 2004, and the Panel issued further Directions as set out in Appendix B2.

These Directions of 17 December 2004 outlined the proposal by IPRH, and agreed by other parties, for a further public exhibition of material, with an invitation for further submissions. The exhibition was advertised in the Latrobe Valley Express, the Age and the Government Gazette on 5th and 6th January respectively.

In addition to the Amendment documents (including the West Field Phase 2 Environment Effects Statement), the following additional documents relating to the issue of greenhouse gases were placed on exhibition:

- A report which will form the basis of a presentation to be given by Mr Dave Quinn, CEO of International Power Hazelwood, to the panel hearings to be held in 2005 to consider the impact of greenhouse gas emissions from the Hazelwood power station;
- Strategic Assessment Guidelines from Mr Andrew Clarke, of Matrix Planning Australia Pty Ltd and further comments on the Strategic Assessment Guidelines from Latrobe City;
- A copy of the International Power Hazelwood's Annual Report on the Environment, Health & Safety and Community 2003;
- A report prepared by CSIRO in response to a request for reconsideration of the Commonwealth Minister for the Environment's decision that the proposed West Field mine expansion is a "controlled action" under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) on the basis of new information, and an accompanying report in relation to the same issue prepared by Enesar Consulting Pty Ltd; and
- The DSE brochure entitled "Climate Change in West Gippsland", prepared by CSIRO (Atmospheric Research) on behalf of the Victorian Government.

The reconvened hearings were held at Powerworks on 24 and 25 January, and 1 and 2 February 2005. Written submissions and expert witness statements tabled at the hearings are listed in Appendices C2 and D2.

The Panel heard the parties listed in Table 2 below.

Table 2 Submitters at the Reconvened Panel Hearing

Submitter	Represented By
The Department of Infrastructure (DoI)	Mr Richard Bolt Dr Helen Murphy (assisting)
International Power Hazelwood (**IPRH**)	Mr. Stephen Davis, Partner of the firm Mallesons Stephen Jaques called the following witnesses: – Mr Dave Quinn, CEO IPRH – Mr Andrew Clarke, Matrix Planning Australia
GTL Energy	Mr John Harrison
Environment Defenders Office	Mr Barnaby McIlrath called the following witnesses: – Dr Alan Pears, Adjunct Professor RMIT University – Dr Hugh Saddler, Managing Director, Energy Strategies Pty Ltd
Australian Conservation Foundation	Mr Charles Berger
Cooperative Research Centre for Clean Power from Lignite	Mr Malcolm McIntosh, Manager Technology Development
Environment Protection Authority (**EPA**)	Mr John Marsiglio
Energy Supply Association of Australia Limited (esaa)	Mr Brad Page, CEO
Australian Power & Energy Ltd	Mr David Lea
Gippsland Trades and Labour Council	Mr John Parker, Secretary
Minerals Council of Australia	Mr Chris Fraser, Executive Director Victoria and Mr Peter Morris, Senior Director, Economics and Commerce

Mr Tony Ferguson of HRL Limited confirmed the “new cooperative approach” between IPRH and HRL outlined by Mr Dave Quinn.

Mr Tony Concannon, Managing Director, Australia of International Power attended Day 14 of the hearing.

4. ISSUES

4.1 NATURE OF SUBMISSIONS

4.1.1 INITIAL SUBMISSIONS

Five submissions on the Planning Scheme Amendment and permits were submitted directly to the Planning Authority, Latrobe City Council. One of these, from Origin Energy, advised of "no objection" to the letter and plan, while the other four referred specifically to Amendment C32 and Planning Permits No. 04189, 04190, 04191 and 04192. In relation to the other four, the CFA, West Gippsland Catchment Management Authority (**WGCMA**), and Department of Primary Industries (**DPI**) advised of "no objection", while Gippsland Water had no objection to the granting of the permits subject to a specified condition being inserted, requiring the referral of the plan of subdivision lodged for certification.

Planning Panels Victoria received 567 written submissions on the exhibited documents. The submissions came from present and past employees at Hazelwood, contractors and staff, other industries and industry bodies associated with power generation in Victoria, residents of the Latrobe Valley, community organisations and Government agencies. Many of these submissions supported the proposal, and followed one of nine standard submission formats. The numbers of such submissions are tabulated below in Table 3, and a brief description of the topics mentioned in the various pro-forma submissions follows after the Table.

Table 3 Pro-forma submissions

Description	Number
Type 1	Approx 300
Type 2	Approx 67
Type 3	Approx 15
Type 4	Approx 4
Type 5	Approx 10
Type 6	Approx 8
Type 7	Approx 18
Type 8	Approx 28
Type 9	Approx 13
Total	Approx 463

A number of other submissions followed one or other of the standard forms, and appended additional comments of support. A copy of the Type 1 submission is attached at Appendix F.

The Type 1 submissions covered a number of issues, including:

- security of employment associated with the West Field proposal;

- pride in IPRH's environmental performance;
- importance of low cost electricity in attracting major manufacturing industries to the state, and the role of West Field in continuing to underpin the Latrobe Valley's prosperity;
- support for the design of the West Field project, in particular the environmental features of the 5th Morwell River Diversion and improvements to the safety of the Strzelecki Highway.

The Type 2 submissions focussed on:

- the role of IPRH in supporting local community groups in the region with contributions of over $600,000 since 1996;
- the importance of the West Field project in providing ongoing employment for 800 jobs, demonstrating Government commitment to the region, and reassuring potential national and international power industry investors that Victoria is a great place to invest.

The other pro-forma submissions included some additional points, including:

- the provision of new precipitators to the Hazelwood Power Station at a cost of $90 million, demonstrating responsible improvement of the asset by IPRH;
- the similarity of the West Field proposal to the previously approved Yallourn Energy mine extension and river diversion;

Other submissions supported the project, and commented on:

- the prospect of putting base load electricity generation at risk;
- putting at risk existing and proposed local projects (Latrobe Magnesium, ash utilisation projects, Moncasa, Energy Brix, kaolin provision to Caroma-Fowler, agricultural soil enhancers, and precipitated calcium carbonate for the paper industry);
- the transition to a low greenhouse gas emissions energy economy by 2050, and the need to continue use of Hazelwood during the transitional years to avoid instability;
- the inability of renewable energy (and wind power in particular) to make a significant contribution to Victoria's energy requirements;
- the alternatives to brown coal based power — if gas power stations were substituted, there would be insufficient local gas, and gas from the North West Shelf would be too expensive, while cleaner technologies will take time to develop to commercial scale;
- the high respect people hold for IPRH as a well managed company, and its reputation as an excellent employer;
- the contribution of IPRH to the development of cleaner technology, including the GTL Energy Limited coal to liquids project;
- the social impact on the area if Hazelwood closed.

Advance Morwell Inc supported the proposal, and made several suggestions with respect to additional dust monitoring, progressive rehabilitation, mine closure and Over-dimensional Route OD9.

The Gippsland Area Consultative Committee supported the project, and suggested that: "*a whole of resource approach could be taken*" so that "*long term access to the coal resource could be facilitated without further expensive changes to infrastructure or disruption to the community.*"

Some six submissions objected to the proposal, on the following grounds:

- Hazelwood Power Station should be replaced by renewable energy in 2009;
- reported potential job losses are exaggerated, with many workers already sacked;
- The submissions in support of the proposal are due to "threats and scaremongering" by IPRH;
- a shift to gas fired power stations will not only improve Greenhouse Gas emissions, but will avoid further impact on productive farmland, existing roads and rivers;
- the proposed Fifth Morwell River Diversion and relocation of the Strzelecki Highway will impact on the future development of coal resources over which HRL Limited has an Exploration Licence;
- the broad economic impact of the proposal, and its particular impact on HRL Limited;
- Hazelwood is the most inefficient coal fired power station in Australia, and represents an inefficient use of available brown coal resources;
- the risk of subsidence should both the IPRH and HRL mines be developed, leaving a potentially unstable "bridge" of coal below the Fifth Morwell River Diversion;
- the high water use associated with the operation of Hazelwood Power Station;
- the scope of the assessment required by the Department of Sustainability and Environment, which excluded consideration of Greenhouse gases, noting that Hazelwood produces higher greenhouse gas emissions per unit of energy sent out than any other power station in Australia.

The Department of Sustainability and Environment (**DSE**) made a written submission outlining what it considered to be defects in the EES, including mine rehabilitation, the scope of fauna and flora investigations, vegetation clearance, and the environmental management system.

The Department of Primary Industries (**DPI**) generally supported the proposal, and raised some issues about mine closure and rehabilitation, and batter slopes and stability.

The Environment Protection Authority (**EPA**) made a substantial submission, covering the proposed road and river diversions; the proposed mine development and river and road diversion design; water; air; noise; environmental management; and mine rehabilitation.

In preparing the list of issues that are addressed by the Panel in this report, the structure of the EES and the proponent's very comprehensive submissions to the Panel hearing have been a useful guide.

4.1.2 FURTHER SUBMISSIONS

Nineteen (19) further submissions were made following the opportunities for further submissions on greenhouse gas emissions arising from the burning of brown coal from the proposed Phase 2 West Field mine (see Appendix C2).

The submission by the Department of Infrastructure (**DoI**) included a copy of the *Greenhouse Challenge for Energy*, a Position Paper released by the Premier on 7 December 2004 which outlines the Government position for driving investment, creating jobs and reducing greenhouse emissions.

The Greenhouse Challenge for Energy cites a report by The Allen Consulting Group dated September 2004 titled "The Greenhouse Challenge for Energy", and a separate volume of appendices to that report. Copies of the Allen Consulting Group report and appendices were requested by the Panel, and provided by DoI.

4.2 ISSUES IDENTIFIED DURING THE PANEL PROCESS

At the Directions Hearing on 12 July 2004 Sallyanne Everett of Clayton Utz on behalf of HRL Limited submitted that:

vii. insufficient time was available between completion of the exhibition and the anticipated commencement of the Panel Hearing to enable submitters to properly prepare their case, and in particular, retain experts to advise and prepare reports for the Panel hearing;

viii. the Planning Authority had not considered all submissions, and had not requested that the Panel be appointed under Section 153 of the *Planning and Environment Act 1987* to consider those submissions;

ix. the Panel should also have been appointed under the provisions of the Water Act;

x. the Terms of Reference to the Panel exclude consideration of Greenhouse Gases produced at the power station through use of the coal from the West Field. There is no provision for such a direction by the Minister in the Environment Effects Act, and it is contrary to the requirements of that Act, and to the requirements of the Planning and Environment Act.

The last of these points was strongly supported by EDO, who had made the same point in their written submission. These four issues are considered as Preliminary Matters.

Further preliminary matters, which set the scene for the consideration of the proposal, are:

xi. background about IPRH;

xii. consultation undertaken by IPRH;

The key issues raised in submissions, being issues on which the principal recommendations have evolved, are:

xiii. the economic provision of electricity generation;

xiv. the most efficient use of brown coal;

xv. the proposed mining method;

xvi. long term options for the Morwell River diversion;

xvii. interface issues with HRL;

xviii. the proposed Fifth Morwell River Diversion;

xix. the proposed road deviations and closures, including Over-dimensional Route OD9;

xx. flora and fauna;

xxi. groundwater extraction and water use;

xxii. air quality and health;

xxiii. noise;

xxiv. greenhouse as emissions from construction;

xxv. greenhouse gas emissions from Hazelwood Power Station

xxvi. landscape values;
xxvii. cultural heritage;
xxviii. social impact;
xxix. mine closure and rehabilitation;
xxx. environmental management;
xxxi. the mining licence, amendment and permit applications, EPA Works Approval and EPBC referral

The issues listed above have been grouped and are addressed in the order shown in Table 4 below:

Table 4 Grouping of issues in the subsequent chapters

Report Chapter	Heading	Issues
6	Preliminary matters	i, ii, iii, iv, v and vi
7	Meeting future electricity needs	vii
8	The most efficient use of brown coal	viii
9	River diversion and mining options	ix and x
10	Interface issues with HRL	xi
11	The proposed Fifth Morwell River Diversion	xii
12	Traffic and transport	xiii
13	Flora and fauna	xiv
14	Groundwater extraction and water use	xv
15	Air quality and health	xvi
16	Noise	xvii
17	Greenhouse gas emissions from construction activities	xviii
18	Greenhouse gas emissions from the Hazelwood Power Station	xix
19	Other social issues	xx, xxi and xxii
20	Mine closure and rehabilitation	xxiii
21	Environmental management	xxiv
22	Approvals	xxv

4.3 APPROACH ADOPTED BY THE PANEL

IPRH in its EES states:

> *"The West Field Project meets IPRH's goal for a cost-effective, uninterrupted supply of coal to Hazelwood Power Station to 2031. However, the project externalises environmental and amenity impacts and opportunity costs; and there may be alternative ways of arriving at the project's externalised benefits (primary electricity supply, but also the consequential effects of employment and economic activity). Therefore, a fuller view on the rationale for the project in the form proposed would benefit from answers to three wider questions. They are:*

- *Is the proposal the most economical alternative to the supply of base load electricity to Victoria and the National Electricity Market?*
- *Is the proposal the most efficient use of the Gippsland brown coal resource?*
- *Are the proposed stream and road rearrangements the most effective?"*

The Panel has considered the first two questions in Chapters 7 and 8 of this report, while the third question has been considered in Chapters 9 and 12.

A number of the issues raised by the IPRH West Field proposal are quite broad in nature, and invite consideration from a regional, State and Commonwealth perspective. Where there are clear policies available, the consideration is facilitated. Such conditions prevail, for example, for the consideration of endangered species at the Commonwealth level through the application of the Environment Protection and Biodiversity Conservation Act, and for the consideration of vegetation clearance at the State level though the Net Gain Policy.

With respect to issues addressed in Chapters 7 (meeting future energy needs) and 8 (the most efficient use of brown coal), the policy settings are not so precise, and it is doubtful that a project based EES and approval process is a satisfactory way of addressing them. The Panel has gone as far as it thinks it can on these issues, but cautions that its findings need to be seen in the context of developing government policy. The Panel's findings might be overtaken by broader considerations of aggressive demand management, full water pricing, a carbon credit scheme, and the removal of caps and subsidies relating to electricity market prices.

Most significantly, the issue of greenhouse gases resulting from the burning of brown coal from Phase 2 of the Westfield Mine proposal in the Hazelwood Power Station, while excluded from the Panel's Terms of Reference, was the subject of Justice Stuart Morris' order (see Sections 3.5, 3.6 and 4.1.2 above). The appeal to VCAT, and the order arising from that appeal, was in relation to Amendment C32 to the Latrobe Planning Scheme alone, and the Panel has received no correction or amendment to its Terms of Reference from the Minister in relation to either the Planning and Environment Act or the Environment Effects Act. The Panel has therefore considered whether it can consider power station greenhouse gas impacts in relation to Amendment C32 (including the four associated planning permit applications made under Division 5—Combined Permit and Amendment Process under the *Planning and Environment Act 1987*), while not considering them in relation to the Environment Effects Statement prepared under the *Environment Effects Act 1978*.

The Explanatory Report for Amendment C32 states:

> *"A detailed description of the proposal and its associated effects are included in the IPRH West Field Environment Effects Statement prepared pursuant to the Environment Effects Act 1978.*
>
> *The planning scheme amendments, applications for planning permit and environment effects statement are being jointly considered under combined approval processes."*

Thus the Explanatory Report makes clear that the EES provides the basis for understanding and analysing the impacts associated with the Amendment and permits, and that the approval process is a combined process. That view is supported by the content of the EES itself, which includes extensive material on Amendment C32, the associated planning permits, the Works Approval Application 55174 and the proposed extension to the Mining Licence under the Minerals Resources Development Act.

The Panel notes that the river diversion works within the area covered by the existing Mining Licence (MIN5004) do not require a planning permit for associated uses, through the relevant clauses in the La Trobe Planning Scheme and the Mineral Resources Development Act 1990 (see Chapter 22 for a more detailed treatment of the approvals process). These overlapping controls further confirm that works exempted from planning approval on the basis of an EES would anticipate that the EES would address relevant environmental effects.

Finally, the Panel is somewhat at a loss to understand how it could consider power station greenhouse gas impacts in relation to the Amendment C32, while at the same time pretending that it has no knowledge of these impacts under the Environment Effects Act. The Panel is compelled to consider the power station greenhouse gas impacts as part of its overall assessment of the EES and statutory approvals.

The Panel would therefore add a further wider question to the three posed by IPRH in its EES, and cited at the beginning of Section 4.3 above. That question is:

- *Does the proposal, and the impact of greenhouse gas emissions arising from it, balance the present and future interests of all Victorians and the maintenance of ecological processes?*

That question is addressed in Section 22 of this report.

4.3.1 CONCLUSION

The Panel has concluded that, as a direct consequence of Justice Stuart Morris' order, and contrary to the Minister's Terms of Reference, it must consider the impacts arising from the burning of brown coal from Phase 2 of the Hazelwood West Field Mine in the Hazelwood Power Station comprehensively in relation to the EES and all the approvals sought, to the extent that the emerging government policy, and the detailed information provided by the proponent and government, allows.

To the extent that the Panel's conclusions and recommendations are not able to, and do not, fully consider the outcome of the separate process on greenhouse gases from Hazelwood Power Station, the comprehensive assessment required for the West Field Project can be undertaken providing the Minister's assessment includes consideration of both the Panel's report and recommendations and the results of the separate process on the emissions of greenhouse gases from the power station.

5. STRATEGIC CONTEXT

5.1.1 STRATEGIC PLANNING FRAMEWORK

This Section identifies the strategic context within which issues associated with the Hazelwood West Field Project must be considered.

The relevant documents that provide the strategic context for considering Amendment C32 to the La Trobe Planning Scheme are as follows:

- The Planning and Environment Act
- La Trobe Planning Scheme – State Planning Policy Framework and Local Planning Policy Framework

5.1.2 THE PLANNING AND ENVIRONMENT ACT

Section 4.2, Objectives of the planning framework, set out in the Planning and Environment Act 1987 includes:

(d) to ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land;

The EES and further material submitted (in relation to the impacts of greenhouse gases arising from burning brown coal in the Hazelwood Power Station) provides a basis for assessing the effects on the environment, and for considering social and economic effects.

5.1.3 STATE PLANNING POLICY FRAMEWORK (SPPF)

Relevant elements of the SPPF listed in the Explanatory Report to Amendment C32 include:

- Environment (Clause 11.03-2)
- Management of resources (Clause 11.03-3)
- Economic well-being (clause 11.03-5)
- Protection of catchments, waterways and groundwater (Clause 15.01)
- Floodplain management (Clause 15.02)
- Air quality (Clause 15.04)
- Conservation of native flora and fauna (Clause 15.09)
- Mineral resources (Clause 17.08)
- Declared highways, railways and tramways (Clause 18.01)
- Subdivision (Clause 19.01)

5.1.4 LOCAL PLANNING POLICY FRAMEWORK (LPPF)

Relevant elements of the SPPF listed in the Explanatory Report to Amendment C32 include:

- **Economic development**, (clause 21.01–08).
  The Municipal Strategic Statement supports continued brown coal mining where it states:
  "The region's energy resources, both coal and gas, and the potential to develop other forms of power generation should, of course, keep the La Trobe Shire at the forefront of the nation's energy supplies for decades into the future. As energy demand grows, the La Trobe Shire should have a strong base from which to compete in the market for additional electricity generation capacity as well as other competing forms of energy based on brown coal."
- **Coal resources** (Clauses 21.07-17, 21.02-8 and 21.04-11)
  The Municipal Strategic Statement identifies the proposed area to be mined for brown coal as a Category A coalfield where Special Use Brown Coal Zone is to be and currently does apply. This forms part of the area deemed to be significant in providing the major proportion of Victoria's energy supplies in the form of brown coal.

  The objectives for coal resources as listed in Clause 21.04-11 are:
  - *To facilitate orderly coal development so that the resource is utilised in a way which is integrated with State and local strategic planning.*
  - *To ensure that the use and development of land overlying the coal resources have regard to the need to conserve and utilised the coal resource in the context of overall resources, having regard to social, environmental, physical and economic considerations in order to ensure a high quality of life for residents.*
  - *To provide a clear understanding within the regional community on the implications of designating land for future coal resource development or for buffer areas on the future use of land."*

  Amongst the various planning scheme responses, the Special Use Zone – Schedule 1 Brown Coal has been applied over Category A coalfields, including open cut mines and associated power stations such as Hazelwood.

- **Industry** (Clause 21.02 – 4)
  Coal and electricity generation along with timber growing and processing are identified as core component of the La Trobe Shire's is industrial base.

- **Strategic Land Use Framework Plan** (Clause 21.03 – 3)
  The La Trobe Strategic Land Use Plan identifies the existing and proposed extension to the Hazelwood mine as being within an area designated to "protect brown coal resources".
- Local Planning Policies
  Clause 22.01 is the local planning policy for Coal Resources. The coal resource is identified in the policy as an asset of National and State importance for energy purposes. The coal industry is also identified as a significant land activity and a key component to the economy of the municipality. The policy sets out a number of decision guidelines for scheme amendments and permit applications in the areas overlying the brown coal resource.

5.1.5 OTHER DOCUMENTS

Other relevant policies and strategies include:

- Victoria's Biodiversity Strategy 1997
- Victoria's Native Vegetation Management Framework 2002
- Victorian River Health Strategy 2002
- State Environment Protection Policy (Waters of Victoria) 2003
- Draft West Gippsland Native Vegetation Plan
- Biodiversity Action Planning – Strategic Overview for the Gippsland Plain Bioregion 2003

6. PRELIMINARY MATTERS

6.1 INSUFFICIENT TIME

At the Directions Hearing, Counsel for HRL submitted that there was insufficient time available between completion of the exhibition and the anticipated commencement of the Panel Hearing to enable submitters to properly prepare their case and, in particular, retain experts to advise and prepare reports for the Panel hearing.

The Panel acknowledged that the timelines in the Minister's Terms of Reference to the Panel were tight, reflecting no doubt the importance of the matter. Whilst the proponent and other Government Agencies involved in the discussions during the preparation of the EES and framing of the process timelines could be expected to meet the timelines, it seemed reasonable to the Panel to allow HRL additional time to prepare its Expert Witness Statements, and the general deadline of 19 July was extended to 3 August for HRL. As HRL were not scheduled to make their submission to the Panel hearing until the ninth day of the Panel hearing, on 11 August 2004, the extra time provided satisfied HRL and was not opposed by other parties.

6.1.1 CONCLUSION ON THE ISSUE OF INSUFFICIENT TIME

The Panel has concluded that the provision of additional time to allow HRL to prepare its Expert Witness Statements has substantially overcome the potential difficulty of insufficient time.

6.2 FAILURE OF THE PLANNING AUTHORITY TO CONSIDER ALL SUBMISSIONS

At the Directions Hearing on 12 July 2004, Counsel for HRL submitted that Latrobe City Council, the Planning Authority, had not considered all submissions, and had not requested that a Panel be appointed under Section 153 of the *Planning and Environment Act 1987* to consider those submissions. In particular, Counsel for HRL pointed to the submission made by Clayton Utz on behalf of HRL (No 510), which was submitted (and received by Planning Panels Victoria) on 18 June 2004 — the closing date for submissions. The submission referenced the EES, the Works Approval, Amendment C32 and the four Planning Permit Applications, and objected to the proposals on a number of grounds. Counsel further submitted that until those submissions were referred to the Panel in accordance with Sections 22 and 23, the Panel cannot consider them.

The Panel noted that Latrobe City Council had not taken into consideration submissions that they deemed to be late. In the absence of any representation from Latrobe City Council at the Directions Hearing, the Panel undertook to have Planning Panels Victoria contact the Council

to seek its further advice on the need to appoint the Panel under the Planning and Environment Act, and to pursue the matter vigorously. In the expectation that the matter could be resolved and rectified as necessary, the Panel sought agreement from the parties that they would continue with the Hearing according to the Schedule proposed.

HRL and their Counsel agreed with the Panel's suggestions. In the event the Council wrote to the Minister on 20 July 2004, referring two opposing submissions (one on behalf of HRL — No 510, and one on behalf of EDO — No 515) to the EES Panel convened to consider the Hazelwood Mine West Field Project.

On 21 July 2004 the Chief Panel Member under delegation from the Minister for Planning appointed the members of the EES Panel as a Panel under Sections 153 and 155 of the *Planning and Environment Act 1987*.

6.2.1 CONCLUSION ON THE FAILURE OF THE PLANNING AUTHORITY TO CONSIDER ALL SUBMISSIONS

The Panel has concluded that the eventual referral of submissions by the Planning Authority to the Minister, and the subsequent appointment of the Panel under Sections 153 and 155 of the Planning and Environment Act 1987, has overcome the procedural problems that would have otherwise arisen.

6.3 PANEL APPOINTMENT UNDER THE WATER ACT

At the Directions Hearing on 12 July 2004, Counsel for HRL submitted that the Panel should also have been appointed under the provisions of the *Water Act 1989*.

The EES notes that "*IPRH will require a licence under Section 67 of the Water Act 1989 to construct works to divert the Morwell River, Eel Hole Creek and Wilderness Creek. The advertisement and review provisions of Section 65 and 66 of that act will be met by that process. The licence will be issued by the West Gippsland Catchment Management Authority if the stream diversions are approved and will include a warranty period and bond. The duration of the warranty period will be linked to performance criteria for the stream diversions*."

The Panel referred this matter to Planning Panels Victoria, which referred it in turn to DSE. DSE has not subsequently sought to have the Panel appointed under the Water Act.

The Panel notes that the West Gippsland Catchment Management Authority (**WGCMA**), the body responsible for administering the Water Act with respect to the Fifth Morwell River Diversion, has been involved in the process through the Technical Reference Group set up to advise IPRH on the preparation of the EES. WGCMA has appointed a peer reviewer, Dr Robert Keller, to review the functional design of the Fifth Morwell River Diversion and Dr Keller made a submission at the Panel hearing. The Panel is satisfied that it is in a position to provide advice to the WGCMA on the merits of the proposed Diversion, as is required under its Terms of Reference, irrespective of whether it is formally required to do so under the Water Act.

6.3.1 CONCLUSION ON THE PANEL NOT BEING APPOINTED UNDER THE WATER ACT

The Panel has concluded that it is empowered to provide advice to the WGCMA under its Terms of Reference, and it is able to do so, notwithstanding that it has not been separately appointed under the Water Act.

6.4 BACKGROUND ABOUT IPRH

International Power (**IPR**) is a UK based electricity generation company, which purchased the Hazelwood mine and power station in 1996 for $2.4 billion. The business was renamed International Power Hazelwood (**IPRH**) in 2002. IPRH assets include:

- The Hazelwood Power Station, a brown coal fired power station, designed to burn coal from the Morwell 1 Seam;
- The Hazelwood mine;
- A mining licence over sufficient coal reserves to support the 40-year life of the business contemplated at the time of purchase.

At the time of purchase, IPRH understood that they would have the opportunity to make one request to the Minister to vary the extent of the mining licence.

Since the purchase, IPRH has spent more than $400 million on plant upgrades to improve power generation and environmental performance, including new dust extraction equipment fitted to the exhaust emission streams from all boilers at a cost of $85 million. IPRH has an environmental management system accredited to ISO14001 since 1998, and has held an EPA accredited licence since 1999.

International Power Australia (IPRA) owns 91.8% of the 1620 MW Hazelwood Power Station (the remainder is owned by the Commonwealth Bank of Australia). IPRA also owns 100% of the 500MW Pelican Point CCGT Power Station, 100% of the four Synergen OCGT Power Stations in South Australia which have a combined output of 350MW, 33.3% (with partners TXU and Origin) of the SEA gas pipeline (providing a connection between Victoria and South Australia), and 100% of the 46MW Canunda wind farm at Lake Bonnie in South Australia. Further wind farm developments are anticipated in South Australia and Victoria in 2005. As well as this horizontal integration in power supply and generation, IPRH also hopes to become vertically integrated in the energy retail market when such participation in the market is allowed.

At the reconvened hearings, Mr Dave Quinn advised of further assets now owned by IPRA, including the 1000MW Loy Yang B Power Station (understood to be a 70:30 partnership with Mitsui & Co Ltd), the 300MW Valley Power (OCGT) peaking plant in Victoria, and the 118MW co-generation (CCGT) power station in WA.

IPRH is a member of the Cooperative Research Centre (**CRC**) for Clean Power from Lignite and has committed to continue membership for the next seven years. IPRH/Hazelwood is involved in developing an innovative coal drying technology, and the Panel was advised that the results to-date look promising.

Conservation initiatives undertaken by IPRH include development of wetlands on the Morwell River at the north end of the Hazelwood mine, and the planting of over 100,000 indigenous trees over the last 7 years.

IPRH outlined to the Panel its principles and values. The core principle was to "Respect the rights of affected parties and laws of the land". Other principles and values were:

- **Environment**

  Maximise shareholder value by:
  - maximising certainty by understanding likely implications of decisions before making commitments;
  - gaining early input through participation in teams with designers, key stakeholders and users;
  - maximising re-use of components;
  - ensuring business continuity;
- **Safety**
  - design for safe construction, operation and maintenance;
- **Communications**
  - create and build positive relationships;
  - success depends on sincere, trustworthy relationships;
  - proactively manage honest and regular communication;
  - actively seek feedback;
  - listen to stakeholders and respond;
  - put a personal face to our corporate citizenship.

The Panel would not normally comment on a company's values, but two matters lead it to do so.

The first is the accusation in one submission that IPRH "attempts, through various media outlets, to force people to write positive EES statements through threats and scaremongering." As detailed in Section 4.1, over 80% of submissions were variations of several forms of letters supporting the project. The receipt of such a high proportion of submissions supporting a project for which an EES has been required is unprecedented, and could give cause for some alarm that the submission process had in some way been subverted.

The second is the issue of credibility, when the power station using the coal from the mine extension under consideration has been described as Australia's most inefficient and dirty (in the sense of greenhouse gas production).

Throughout the Panel process, the Panel found representatives of IPRH to be open and very responsive to questions from the Panel and others. The management climate was one where IPRH staff had significant delegated powers and were free to speak on behalf of the company within those areas. Although the CEO of IPRH was present throughout the Hearings, IPRH staff volunteered information to the Panel without any overt concern that the CEO might want to vet what was about to be stated.

On the issue of the many positive submissions, IPRH volunteered that it had been greatly concerned at the possibility that those people concerned with greenhouse gas emissions and the low efficiency of the Hazelwood Power Station might unduly influence the decision, and

had sought to ensure that staff, contractors and the community who supported the extension of the mining licence should be heard. To this end they provided information to their stakeholders on which submissions could be based. In response to a question on this matter by the Panel, IPRH advised as follows:

> *"IPRH encouraged its employees and the community to make submissions on the EES in support of the project. To facilitate this IPRH prepared a number of form letters to guide those who sought to make submissions. In most instances, those who submitted modified those pro forma letters to express their own views on the project. IPRH in no way coerced or threatened anyone to make a submission on the EES. The fact that the Latrobe Valley is just recovering from restructuring of the Victorian electricity industry and the strident calls from some stakeholders for closure of the Hazelwood Power Station were a possible catalyst for the strong response to IPRH's invitation."*

The Panel Hearing was conducted in quite an informal atmosphere, with goodwill exhibited by all those who took part in the proceedings. Even when the interests of other parties were at stake, whether these were the commercial interests of HRL, or the environmental and public interest of the Environment Defenders Office (**EDO**), all parties worked to assist the Panel understand the issues and to be in a position to evaluate the different viewpoints.

6.4.1 CONCLUSION ON IPRH'S APPROACH TO THE EES AND HEARINGS

The Panel was impressed with the high quality of the EES, and IPRH's efforts to thoroughly examine issues relating to the proposal. The Panel commends IPRH for its openness, diligence and competence in providing information to the Panel to assist the Panel in coming to its conclusions.

6.5 CONSULTATION UNDERTAKEN BY IPRH

IPRH states in the EES that their consultation program has been in progress since 1999, when they began engaging stakeholders during feasibility investigations for Phase 1 of the West Field Development. The Panel was told by IPRH staff that the consultation with landowners involved sharing with them IPRH's developing plans, on the basis that the final plans would hold no surprises for affected landowners. This policy of openness seems to have worked extremely well. Of the twelve landowners from whom land was acquired, or is being negotiated, not one submitted an objection to the proposal.

In 2001–2002 when IPRH had settled on the West Field as its preferred mine development option, the consultation was extended to other stakeholders with a commercial interest, including infrastructure owners. During 2003–2004 during the preparation and exhibition of the EES, formal consultation with agencies was through scheduled meetings and through the Technical Reference Group (**TRG**), which was set up by DSE. Consultation with the wider community during the preparation of the EES was through stakeholder information sessions, project information displays, project information bulletins and an IPRH dedicated West Field Project website.

The Environmental Review Committee (**ERC**) set up as a requirement of the Mining Licence was another strand in the consultation process, and provided some useful links to the

community from the outset. The consultation program assisted in identifying key issues for further study and reporting.

One of the key issues for the Maryvale EES, a somewhat similar proposal by Yallourn Energy some five years earlier, was the impact of the construction and mining activities on neighbours, and the potential health effects of the increased airborne dust. IPRH was well aware of the importance of this issue, and it was clear to the Panel that IPRH and their consultants had worked closely with EPA and the Department of Health to arrive at an agreed methodology and outcome.

It appeared that the TRG had not been so successful in other areas. The submissions from DSE and DPI raised a number of issues of concern, issues that might have been expected to have been resolved prior to the finalisation of the EES. Issues such as the mine rehabilitation, progressive rehabilitation of mine batters, adequacy of the flora and fauna studies and details of the proposed environmental management processes were the subject of critical departmental comment in submissions. During the Panel Hearing, it became apparent that net gain offset entitlements, processes for monitoring the net gain agreements, and arrangements for finalising the OD9 route statutory planning had also not been clarified through the TRG process.

With respect to ongoing consultation, the Panel was advised that the ERC process was working well, although its procedures varied significantly from the guidelines prepared by DPI. While the guidelines restrict the ERC to matters within the mining licence area, the Hazelwood ERC does in practice consider broader issues of public concern such as air quality outside the mining licence area. In the case of the IPRH ERC, it is chaired by a member of IPRH, rather than by someone from DPI or an independent chair. The arrangements for the ERC are reported to be working well. It seemed to the Panel that the ERC should not be confined to matters within the Mining Licence. Indeed if such a restriction were imposed, it might well be necessary to have another ERC appointed with say a statutory planning or environmental protection brief. Obviously that would strain the limited community resources available, and a broader ambit for the Hazelwood ERC seems essential.

One issue that the Panel noted was the small representation on the ERC from the local community. This would seem to reflect two conditions: first that there are not too many divisive issues surrounding the IPRH operation, and secondly that the local community have many higher priorities for their limited time than participating in the ERC. The Panel was concerned that an ERC in which there was a cosy relationship between all parties may not be conducive to the rigorous review of IPRH's operations and commitments that is desirable for such a body. It was with some surprise then, that the Panel found that Advance Morwell Inc, a group who had made a substantial submission on the EES and who attended and made a verbal submission to the Panel, were not represented on the ERC.

The Panel was pleased to hear from IPRH that they were about to commence advertising for additional community representatives on the ERC, and that they would also invite Advance Morwell Inc to submit an expression of interest in being represented on the ERC.

The Panel was told that candidates for membership of the ERC were subject to a vote from the ERC before they were admitted. While the interests of harmony may well be advanced by such a process, the earlier comments on the relationship between members of the ERC are relevant. As the ERC is a forum for the community to have a say, any voting relating to community membership should be confined to the community or its representatives. It would

be hoped that the guiding principle for community membership would be to ensure that the widest representation of different views was accommodated.

6.5.1 CONCLUSION ON CONSULTATION THROUGH THE ERC

The Panel believes it desirable for DPI to review the Guidelines for ERC's, particularly with reference to the ambit of their considerations. The issues that will most affect communities are off-site effects, and it is essential that the ERC provide a forum where these issues are reviewed. Many of the commitments for ongoing design, implementation and monitoring made by IPRH and the requirements of approval authorities affect areas outside the IPRC mining licence boundary, and the boundary of the proposed new mining licence. For these commitments and requirements to be properly reviewed by the ERC, it is essential that a mechanism be found to remove the present restriction in the guidelines.

The Panel supports the proposal by IPRH to broaden the community membership of the ERC, provided that the procedures currently in place are reviewed to ensure that community membership represents a variety of community views.

6.5.2 RECOMMENDATION ON CONSULTATION THROUGH THE ERC

The Panel recommends that DPI reviews the Guidelines for ERC's to ensure that commitments and requirements outside the Mining Licence area are included within the ambit of the ERC.

7. MEETING FUTURE ELECTRICITY NEEDS

*"Is the proposal the most economical alternative to the supply of base load electricity to Victoria and the National Electricity Market?" (*EES, Section 3*).*

7.1 INTRODUCTION

In Section 3.1 of the EES, the proponent summarises the need for base load and peak load power, the types of generators that have evolved to meet this demand, and the role of Hazelwood Power Station in contributing 22% to 23% of base load electricity to Victoria, and approximately 5% to the National Electricity Market. It should be noted that the latter figure includes both the contribution to Victoria and some sales inter-state when prices are favourable.

Information on future supply and demand, new technologies, timing and policy constraints was provided by the proponent in several documents and presentations including:

- a summary in the EES;
- a report by McLennan Magasanik Associates Pty Ltd (**MMA**) entitled "Hazelwood Power Station in the National Electricity Market and Alternative Sources of Supply" (MMA 2003) which was referenced in the EES and provided to the Panel, and a further report by Dr Ross Gawler of MMA;
- in extracts from the 2003 and 2004 "Statement of Opportunities" by the National Electricity Market Management Company Limited (**NEMMCO**);
- in The Greenhouse Challenge for Energy, Driving investment, creating jobs and reducing emissions, Position Paper, December 2004, and the background Report by The Allen Consulting Group (and Appendices) dated September 2004

Further information was provided by a number of submitters, including:

- submissions and presentation by Chris Fraser, Executive Director of the Victorian Minerals & Energy Council;
- in evidence to the Panel by Keith Orchison (presented by telephone link);
- a submission and presentation to the Panel by David Lea for Australian Power & Energy Limited (**APEL**);
- a submission and presentation by John Harrison for GTL Energy Ltd;
- a submission and presentation by Brad Page for the Energy Supply Association of Australia Limited (**esaa**)
- a submission and presentation by John Parker for the Gippsland Trades and Labour Council;
- submissions and presentation by the CRC for Clean Power from Lignite;
- submissions and presentations by the Environment Defenders Office;
- a submission and presentation by Alan Pears;

- a submission and presentation by Hugh Saddler;
- a presentation on behalf of HRL Developments Pty Ltd by Dr Terry Johnson;
- a submission and presentation by Mr George Phair;
- a submission by the National Council of Women of Victoria, and a presentation on their behalf by Dr Patricia Phair.

7.2 SUPPLY AND DEMAND

7.2.1 THE PROPONENT'S ASSESSMENT

The 2003 "Statement of Opportunities" by the National Electricity Market Management Company Limited (**NEMMCO**) provides an assessment of the supply-demand future for the eastern states. Victoria and South Australia are combined. The assessment for Victoria and South Australia describes how for the years 2003/04 to 2006/07 power generation reserves will be below a "minimum reserve level", while from 2008/09 to 2012/13 there will be a shortfall of supply, with reserves in generation below zero. In 2012/13 this shortfall is predicted to be of the order of 2,000 MW. The summer "minimum reserve levels" are predicted on the basis of extreme summer temperatures, demand conditions that would only be expected to occur every ten years.

The NEMMCO 2004 "Statement of Opportunities" notes that from the commissioning of Basslink in 2005/06 onwards, there is an additional capacity of 600 MW to the Victorian and South Australian region. Nevertheless, capacity to maintain reliability standards is expected to be exceeded in 2004/05, and from 2006/07 there is expected to be a shortfall in supply. In 2012/13 the summer shortfall is anticipated to be over 2,500 MW, and over 3,000 MW in 2013/14.

The NEMMCO 2004 report notes that the reserve deficits in 2005/06 and onwards are not affected by interconnector capacity.

IPRH commissioned a report by McLennan Magasanik Associates Pty Ltd (**MMA**) entitled "Hazelwood Power Station in the National Electricity Market and Alternative Sources of Supply" (MMA 2003). The MMA report provides information on the indicative sent-out generation for Victoria over the period 2000 to 2015 (see Figure 8 below — but note that the legend has incorrectly identified Hazelwood and Yallourn) and the indicative Victorian sent-out generation with Hazelwood shut down (see Figure 9 below), with contributions from Hazelwood dropping to zero over the period 2005 to 2011.

The relevant Figures from the NEMMCO 2004 report are shown as Figures 6 and 7 below.

Figure 6 Interpreting the Supply-Demand Charts

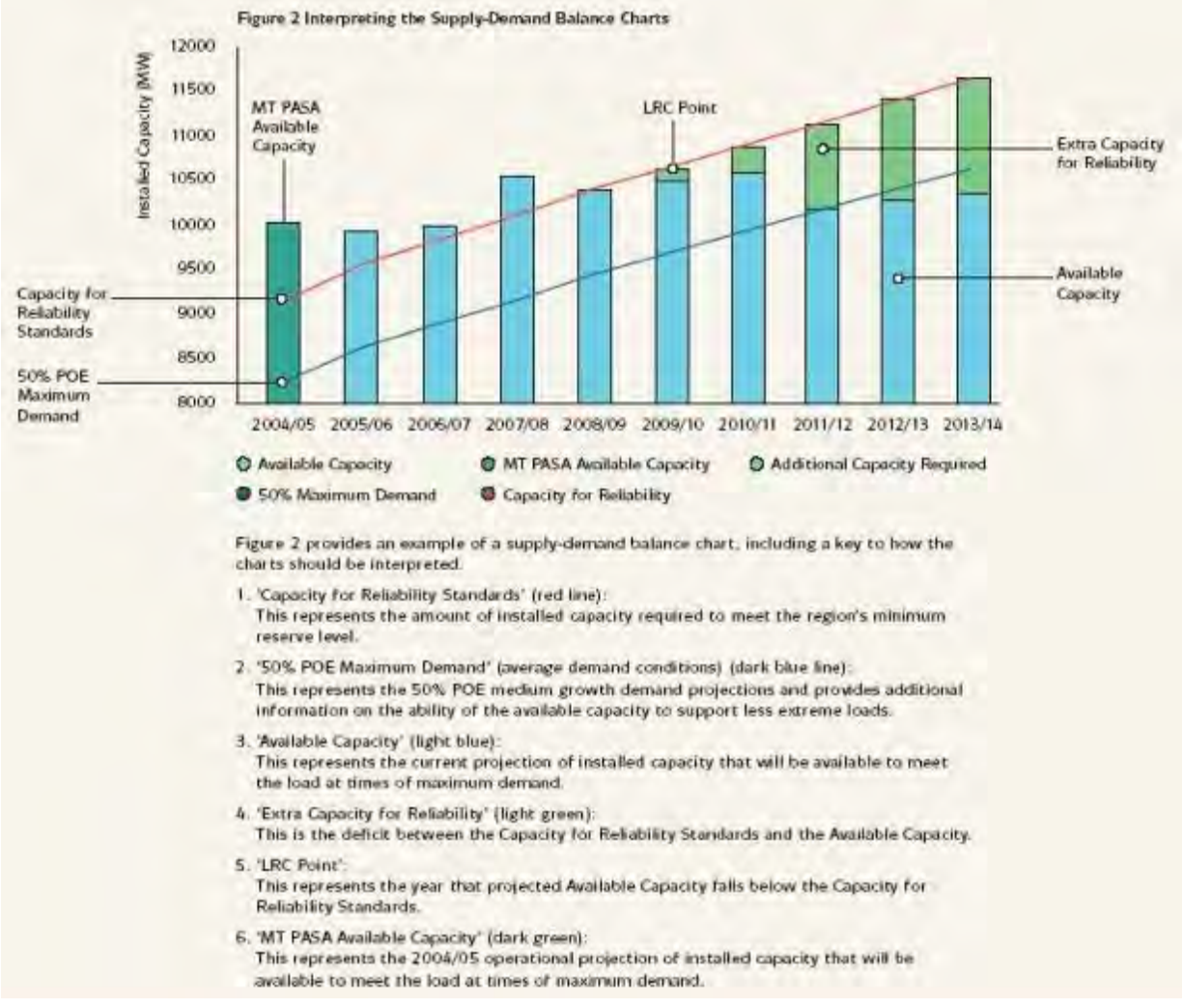


Figure 2 provides an example of a supply-demand balance chart, including a key to how the charts should be interpreted.

1. 'Capacity for Reliability Standards' (red line):
   This represents the amount of installed capacity required to meet the region's minimum reserve level.
2. '50% POE Maximum Demand' (average demand conditions) (dark blue line):
   This represents the 50% POE medium growth demand projections and provides additional information on the ability of the available capacity to support less extreme loads.
3. 'Available Capacity' (light blue):
   This represents the current projection of installed capacity that will be available to meet the load at times of maximum demand.
4. 'Extra Capacity for Reliability' (light green):
   This is the deficit between the Capacity for Reliability Standards and the Available Capacity.
5. 'LRC Point':
   This represents the year that projected Available Capacity falls below the Capacity for Reliability Standards.
6. 'MT PASA Available Capacity' (dark green):
   This represents the 2004/05 operational projection of installed capacity that will be available to meet the load at times of maximum demand.

Figure 7 Victorian and South Australia Summer Outlook

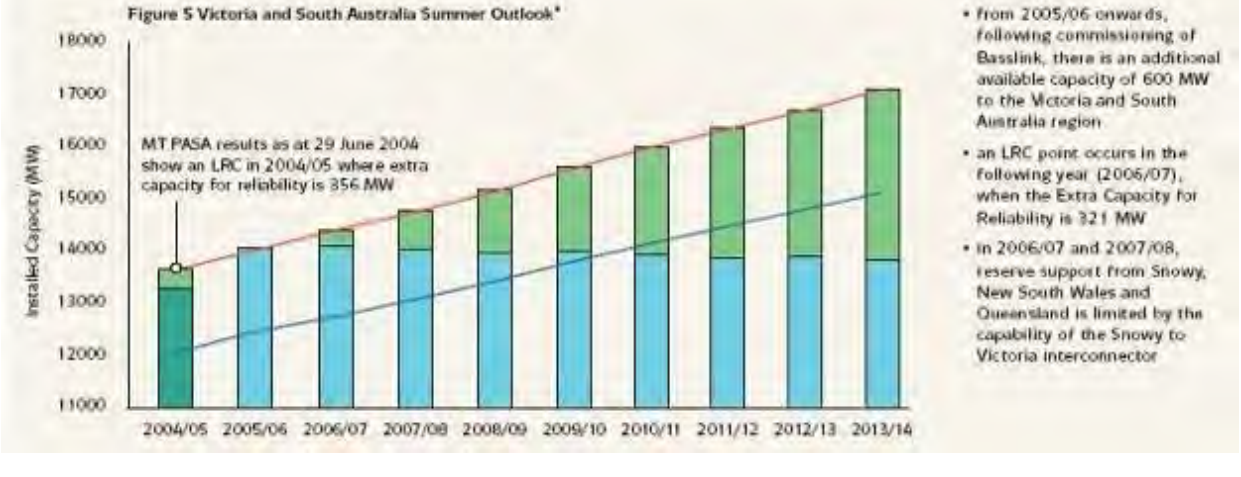


Figure 8 Indicative Sent-out Generation for Business as Usual

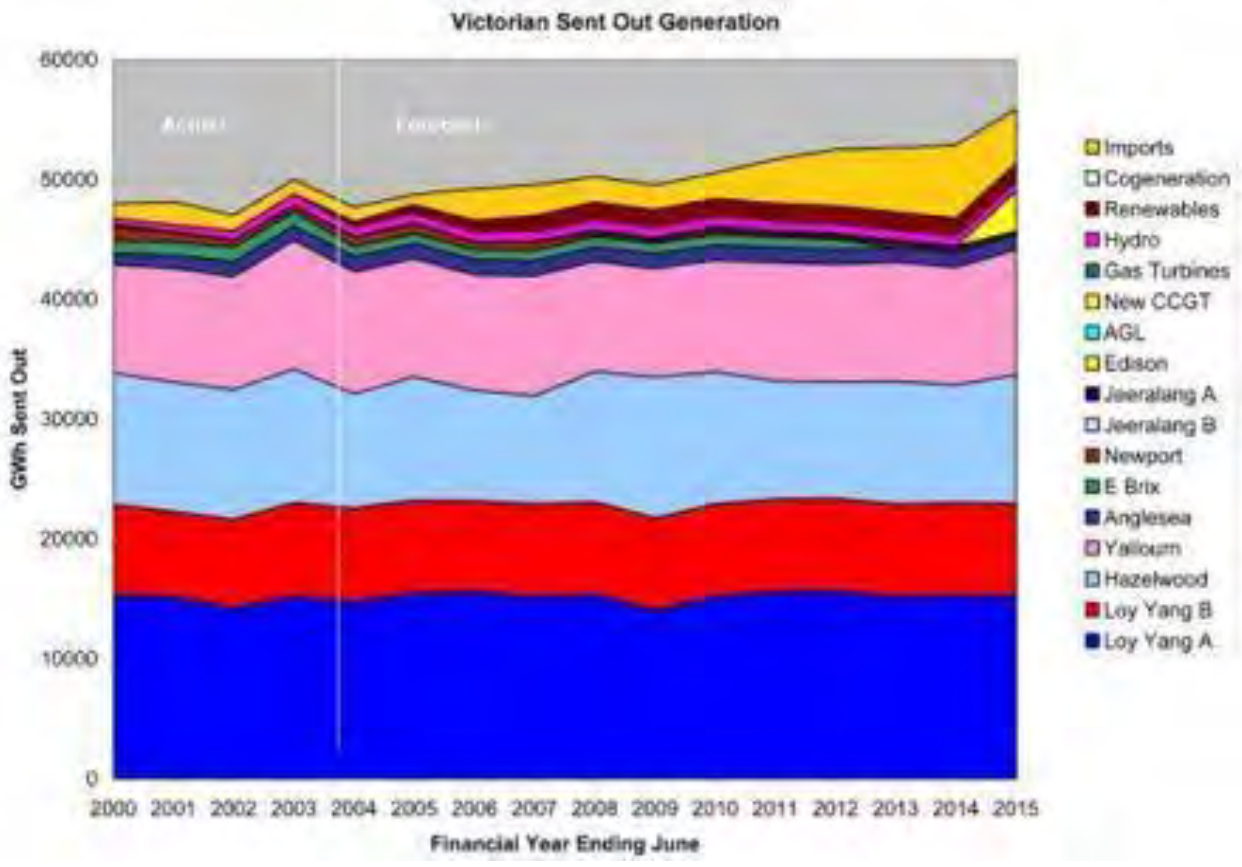
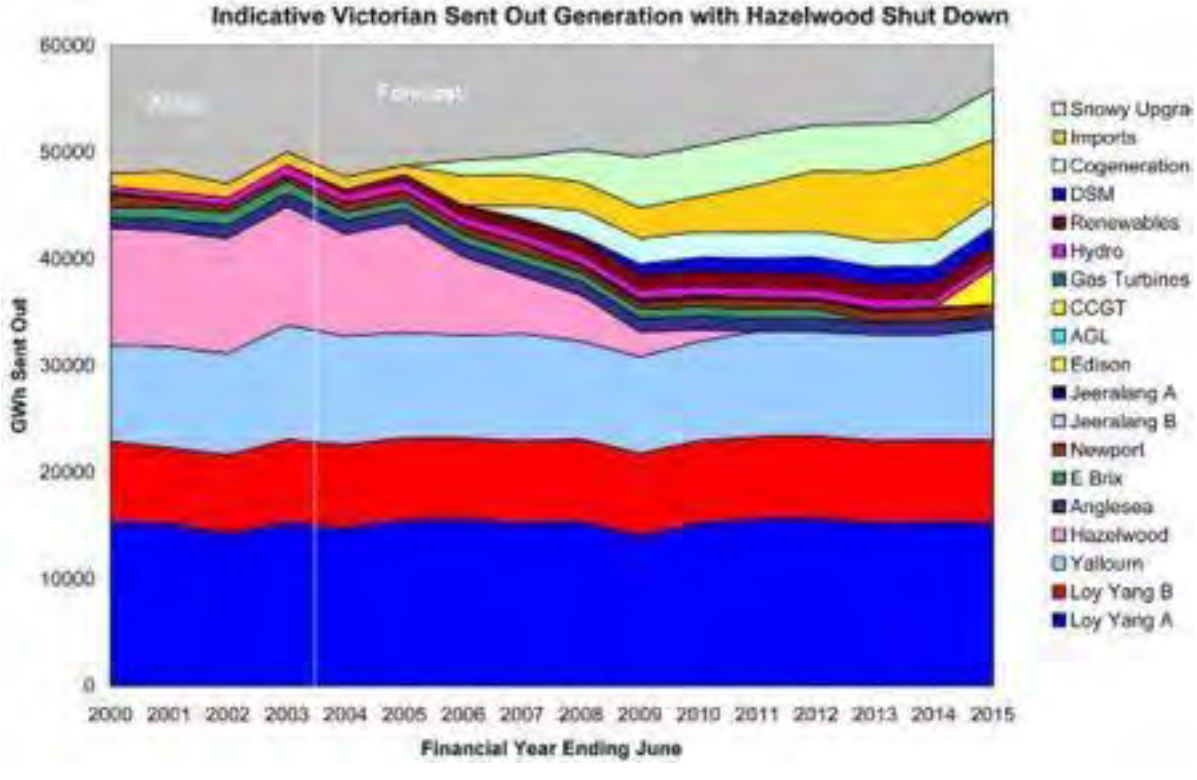


Figure 9 Indicative Scenario of Replacement of Hazelwood Power by 2010



The Executive Summary of the MMA report states, in part:

> *"By 2010, the existing accessible brown coal resources will have been consumed and rundown of mine production would commence by 2009 if no action is taken. Whilst the production profile could maintain full production until 2009 and close down within one year, to minimise its financial losses, IPRH might consider reducing production much earlier to force market prices to reflect the constrained fuel supply. In respect of the NEM, this scenario represents a 'best case' where the reduced production would signal a need for new capacity and facilitate an orderly changeover to new power supplies over several years."*

and

> *"However, even a gradual shut down of HPS is likely to produce a period of much higher wholesale market prices up to at least $42/MWh minimum, about 43% higher than the average of $29/ MWh over the last two years. MMA expects Victorian pool prices to average about $34/ MWh (in June 2003 dollars) in the period from 2005 to 2010, so the price increase at the wholesale level is about 24%. Such price rises would have an adverse impact on the Victorian economy."*

and

> *"The market need for HPS is defined in terms of on-going demand for base load electricity in Victoria under a business as usual scenario. Hazelwood is clearly a low-cost way of delivering this service. Other options to allow replacement of HPS output are at least 20% more expensive and would have a disruptive effect on the Latrobe Region and the electricity market in general."*

To replace electricity should Hazelwood Power Station be closed, MMA has relied principally on increases in the "Snowy Upgrade[1]", imports, cogeneration, demand side management (DSM) and increased use of gas, principally at Newport Power Station. Demand side management is indicated to rely on more efficient dwellings and appliances, rather than reduction in use. In relation to the replacement scenario, MMA cautions that: "*This analysis is NOT BASED ON A FULL MARKET SIMULATION but rather a simple energy replacement analysis, to give an appreciation of one possible response to the closure of HPS*."

7.2.2 OTHER SUBMISSIONS

Of the other submissions to the exhibited documents, and presentations to the Panel, listed above in Section 7.1, the first five (from Dr Keith Orchison, David Lea, the CRC for Clean Power from Lignite, the Electricity Supply Association of Australia (**esaa**), and the Victorian Minerals & Energy Council) were from submitters associated with the power industry, and supportive of IPRH's position.

Dr Keith Orchison, a past CEO of the Australian Petroleum Exploration Association, and from 1991until 2003 the CEO of the Electrical Supply Association of Australia, made a number of points in his submissions. These included his views that:

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1 The MMA Report notes that "It could well be determined by VENCorp that an additional transmission line is needed for security of supply on the Snowy interconnection and this would involve additional costs, the need for easement acquisition and perhaps land clearing."

- to meet future electricity demand, it will not be a choice between fossil fuels and renewables, but a combination of these;
- significant increases in demand management requires significant increases in retail electricity prices;
- the additional gas required to fuel the gas power station component of the new generation capacity target of VENCorp of 2050 MW (estimated as over 1500MW from gas turbines, even with 1000MW of wind turbines constructed) will require the discovery and development of new gas fields and power stations.

Dr Keith Orchison also pointed to the continuing growth in demand for electricity in all of Australia's regions. Historical data, and forward estimates for Victoria's demand growth were presented, and are summarised in Table 5 below. The Panel has extended the annual consumption figures provided in the submission to calculate annual growth rates in the intervening years.

Table 5 Victoria's electricity demand over time

Year	Consumption GWh	Increase GWh	Increase %	Period of Increase Years	Annual Increase % Compound
1955	3,100	N/A		N/A	N/A
1975	14,069	10,969	353.8%	20	7.9%
1995	32,511	18,442	131.1%	20	4.3%
2002	39,006	6,495	20.0%	7	2.5%
2020	60,000	21,000	53.8%	18	2.3%[1]

Note 1 The estimate for 2020 is based on a 2.3% growth rate for the 18 years.

Dr Keith Orchison summed up the preferred course of action to sustain the reliability of the system, as he saw it, as follows:

- drive al elements that will give better environmental outcomes;
- drive end use efficiency;
- work with governments to get a coordinated approach.

Dr Peter Jackson, CEO of the Cooperative Research Centre for Clean Power from Lignite, made a submission on the exhibited documents. In that submission, he stated that IPRH, along with other Latrobe Valley based lignite power generation companies, participates in the CRC, providing both cash and in-kind support. The Centre's activities include fundamental research, applied research, technology development and commercialisation. As well as new technologies, the research also focuses on thermal efficiency and operational improvements for existing lignite power stations. Peter Jackson concludes by noting that none of the more efficient technologies he cites are commercially viable for the industry.

The submission by **Chris Fraser**, Executive Director of the Victorian Minerals & Energy Council, summarised the benefits accruing from the proposal in these terms:

> *"The importance of the West Field development nationally is that it will:*
>
> - *ensure the National Electricity Market enjoys a secure, clean and reliable base-load electricity supply well into the future; and*
> - *maintain competitive electricity prices for domestic and business consumers.*

The final six submitters listed above in Section 7.1 (EDO, Dr Alan Pears, Dr Hugh Saddler, HRL, George Phair and Dr Patricia Phair) were opposed to IPRH's proposals.

EDO made a very comprehensive submission in writing following the exhibition of the EES, and made submissions both at the Directions Hearing (as described in Section 6.4) and the substantive Hearings. EDO called Dr Mark Diesendorf as an expert witness, who presented a 'Discussion Document' entitled "Victoria's Clean Energy Future", and made a verbal submission to the Panel by telephone. The paper offered an alternative scenario for the replacement of Hazelwood Power Station by 2010 to that set out in the MMA report.

The alternative energy mix to substitute for Hazelwood in 2010 is shown in Table 6, reproduced from Table 4 in the discussion document (note, not all columns are reproduced below).

Table 6 Energy mix to substitute for Hazelwood in 2010

Technology	Rated power (MW)	Capacity factor	Peak demand (MW)	Elec. sent out or saved GWh/y	Cost of elec. gen. or saved (c/kWh)	Cost of elec. gen. or saved ($M/y)
Bio-electricity	120	0.70	84	736	7.5	55.2
Gas CC	300	0.80	240	2102	4.5	94.6
Gas: cogeneration	540	0.85	459	4021	4.1	164.9
Wind	1000	0.30	300	2628	7.5	197.1
EE: residential	N/A	N/A	130	1064	3.0	31.9
EE: commercial	N/A	N/A	302	9230	3.0	27.6
EE: industrial	N/A	N/A	94	204	3.0	8.1
Total	N/A	N/A	1609	11675	N/A	577.4
Hazelwood	1600	0.8	1280	11213	3.8	426.1

Notes: a. EE denotes efficient energy use and includes fuel substitution at point of use and solar hot water.

b. Cost (last column) is for 2010, the sixth year of implementing the program. EE contributions increase with time and their total NPV could be less than that for Hazelwood. However, there are uncertainties in costs of refurbishing Hazelwood and new coal mine, among others.

The discussion document sets out a number of recommended policies and strategies, including:

- expand the Mandatory Renewable Energy Target (MRET);
- ban conventional coal-fired power stations;
- set a maximum greenhouse intensity for new power stations;
- implement tradeable emission permits;
- remove subsidies for fossil fuels and energy wastage;
- encourage the purchase of solar hot water;

- mandate energy efficiency measures.

The discussion document considers the costs and savings of the alternative scenario to both government (social equity areas) and consumers (costs — expanding MRET, banning coal fired power stations, and tradeable emission permits: benefits — avoiding the new mine costs, and reduced amount of energy consumed). On the question of net costs, the discussion paper states: "A much more detailed study would be required to investigate whether there is any net cost to electricity consumers of the cleaner energy mix for the State".

EDO's second submission to the initial Panel Hearing, headed "*Positioning Victoria to Prosper in a Carbon Constrained Economy*", respected the Panel's request that the Minister's exclusion of the Greenhouse Gas Emissions be followed by all submitters, and was restricted to the advancement of economic argument.

The submission first addressed the relevance of economic issues for assessment under the Planning & Environment Act 1987.

The submission then reiterated seven propositions outlined in its written submission to the exhibited documents, stating that the propositions remain relevant to the efficiency question currently before the Panel. The seven propositions are:

1. A future carbon constrained economy is a fait accompli.
2. Despite a failure to ratify the Protocol, State and Federal governments in Australia have announced policy commitments to achieve Kyoto targets.
3. Beyond 2012 the pressure to reduce emissions beyond the Kyoto targets will increase.
4. The Victorian Government accepts the need for larger reductions than those required by the Kyoto protocol.
5. Increasing demand for electricity in a carbon constrained economy will lead to higher prices. Higher prices, combined with the advantage of avoiding carbon mitigation costs will make less carbon intensive technologies relatively more competitive than they are today.
6. The capacity for growth in the stationary energy sector depends on the ability to mitigate emissions in a carbon constrained economy. Renewable energy does not face this constraint. Less carbon intensive suppliers of energy face fewer constraints on growth than energy suppliers reliant on brown coal and are better placed to meet the needs of society in the carbon constrained economy.
7. Demand for energy will grow with population increases over time.

The submission then reiterated the economic arguments EDO say support the rejection of the proposal, namely:

i. Rejecting the proposal will not result in unmanageable impacts on base load electricity supply capacity.
ii. Among the electricity generators, the risk exposure of Hazelwood and its Victorian electricity consumers to adjustment costs for compliance with Kyoto are probably the highest in Australia.
iii. The fixed costs of providing renewable energy are falling with time.
iv. Price structures have a role to play in fostering renewable energy and reducing demand.
v. The price of brown coal does not properly account for externalities and risk including:
    a) Greenhouse Abatement (mitigation) costs;

b) subsidies for fossil fuel, which undermine renewable energy;
c) the true cost of water used in producing electricity;
d) adjustment risks associated with the transition to the carbon constrained economy;
e) refurbishment costs for the Hazelwood Power Station.

vi. Decisions which extend the use of brown coal will hinder development of the renewable energy industry.
vii. The diversification of energy supply away from centralised generation should be encouraged wherever possible to:
a) take advantage of job opportunities in the renewable energy sector;
b) reduce distribution losses;
c) improve the capacity of the grid to deal with catastrophes or other interruptions to supply;
d) support rural communities.

EDO then stated that In addition to the factors listed in the original submission, a number of additional economic arguments now need to be factored into the discussion, as follows:

1. The evidence of Dr Mark Diesendorf suggests that the additional costs to the community of alternative electricity supply options would be paid for by economic savings achieved from demand side efficiency measures. New jobs created by cleaner energy supply options would far outweigh job losses in the coal industry.
2. It also submitted that if all relevant costs of the proposal are factored in, alternative supply options represent a sounder economic strategy than that offered by the proponent.
3. It is submitted that the prospect of geosequestration and its backing by the Federal Government's recently released energy policy provides a medium to long-term option for use of the resource. It can no longer be argued that if we diversify electricity supply options now, the brown coal resource will be wasted.
4. The more efficient use of the coal is now supported by the interests of HRL, who allege they can, and are actually required by the terms of their exploration licence, to exploit the resource in a more efficient manner consistent with world's best practice.

The submission proceeds to address adjustment costs in the event that Kyoto is ratified, externalities, subsidies and the true cost of water.

With respect to subsidies, EDO quotes papers by Reidy 2003 and Reidy and Diesendorf 2003, as follows:

> *"Reidy concludes that as much as $9 billion in subsidies encourages the use of fossil fuels in Australia annually. Further, he states:*
>
> > *About 58% of the total fossil fuel subsidies identified are perverse subsidies. These subsidies increase GHG emissions while at the same time reducing economic efficiency. Removal of these perverse subsidies can provide a 'double dividend' of greenhouse abatement and improved economic performance."*
>
> 1 Subsidies referred to by Reidy include:
> i. subsidies for supply of electricity to Aluminium smelters;
> ii. concessions for electricity;
> iii. pricing structures;

iv. subsidies for centralised generation.

2 Subsidies also relevant include:

ii. tax benefits for salary packaging motor vehicles;

iii. Greenhouse Gas Abatement Program (which goes mostly to fossil fuels);

iv. fuel excise reduction;

v. fuel sales grants scheme;

vi. automotive industry support;

vii. land for roads and car parking;

viii. reduced import duty on 4WDs;

ix. inappropriate company tax concessions;

x. R & D support for fossil fuels;

xi. non-recovery of government agency cost.

EDO in its submission to the reconvened hearings reiterated its view that the MMA identified market replacement to Hazelwood Power Station can be economically acceptable for the people of Victoria under a business as usual analysis.

Dr Alan Pears, Adjunct Professor at RMIT University, and Director of Sustainable Solutions Pty Ltd summarised his evidence as follows:

- *Victoria's load profile has been distorted over many decades by the State Electricity Commission's efforts to increase base load to facilitate maximum use of inflexible brown coal fired power stations, including through use of extremely low off-peak electricity prices. This has led to load shifting and wasteful use of energy in off-peak periods. This means the potential for energy efficiency improvement to reduce base load is very large.*
- *Partly because of the above distortion, there is at least 1,600 MW of base load demand in the residential and commercial sectors, as well as a large potential in industry.*
- *Cost effective electricity efficiency potential in Victoria would reduce commercial and residential electricity consumption by around two-thirds, and industrial consumption by at least 40%, saving more than twice as much electricity as is now supplied by the Hazelwood power station. The cost of these measures varies from negative (i.e. cheaper up-front) to around the same as investment in power supply. Demand supply measures would also reduce peak demand problems and avoid large investments in transmission and distribution networks, further enhancing their economic benefit.*
- *The timeframe for capture of energy efficiency potential identified in this project is very dependent on the effectiveness of policies and programs. Much could be captured within five years, although some of the savings rely on limited amounts of technology development and some measures are best integrated with refurbishment, equipment replacement and new investments to optimise cost-effectiveness.*
- *A comprehensive strategy that includes energy efficiency (Including cogeneration), fuel switching at point of use and renewable energy has the potential to reduce Victoria's conventional electricity use in absolute terms, and avoid the need to operate Hazelwood. However, to achieve this would require strong and effective policies that target both existing and new equipment and buildings, and further reform of the electricity market to provide appropriate price signals to both electricity suppliers and consumers.*

- *Early action to avoid the ongoing need for Hazelwood would provide more flexibility for the balanced management of coal resources and development of alternatives. Deferment of expansion of the coal resource would also reduce the risk of creating a 'stranded asset' in the form of the developed coalfield."*

The submissions by **Dr Terry Johnson** for HRL, **George Phair** and **Dr Pat Phair**, while being directed in part or whole at the efficiency of new brown coal technology, also supported the view that the electricity supply scenario suggested by MMA was deficient in that it did not advocate the upgrading of the Hazelwood Power Station, or replacement by more efficient technologies.

7.3 NEW TECHNOLOGIES

A number of new technologies were outlined to the Panel during the Hearings, involving both renewable energy and non-renewable energy. Those new technologies using coal as a feed stock promise advances in coal use efficiency, greenhouse gas emissions, and water consumption.

IPRA has some involvement with new technologies. Table 7 shows its current assets and involvement with new technology.

Table 7 IPRH interests in power generation

Asset or Interest	% Share owned by IPRA	Generation capacity MW
Hazelwood Power Station	91.8%	1720
Loy Yang B Power Station	100%	1000
Pelican Point CCGT	100%	500
Synergen OCGT's	100%	360
Canunda Windfarm	100%	46
CRC Clean Power from Lignite	A contributor along with other Latrobe Valley generators	N/A

IPRH are also involved with the Coal to Liquids Project with the Adelaide based company GTL Energy Limited, which could involve an integrated gasification and gas-to-liquids plant for the Hazelwood mine, based on the patented technology of the US based company Rentech. The process would be based on Yallourn 1 Seam Coal, which overlies the Morwell 1 Seam Coal used in the Hazelwood Power Station.

With respect to the capacity of wind energy to make a substantial contribution to Victoria's electricity needs, the Panel was advised (see EDO#8) that allowing for the variation in wind conditions, the overall availability of power from a wind turbine may be in the order of 30%. NEMMCO 2003 included Table 2.12, which tabulated the availability of new non-scheduled embedded generation at the time of maximum demand, and for Wind it showed an availability of 7%. Dr Mark Diesendorf gave evidence that the requirement for back-up power as a

percentage of wind generated capacity fell as the total amount of wind power increased. He quoted a Clean Energy report that estimated that if 20% of Australia's electricity generation was provided by wind, there would be the need for 25% of the installed wind capacity to be backed up with gas turbines.

Mr Dave Quinn advised the Panel that the difficulty in being able to commit to the market for specific periods was a constraint for those owning wind farms. He went on to say that the ownership of other generation capacity such as coal and gas fired power stations in association with wind farms (as is the case with IPRH) can alleviate this problem.

Turning now to new technologies for power generation from coal, advice from a number of sources was provided to the Panel, and a summary of that advice is set out in Table 8.

Table 8 New technologies for power generation from coal

Process	Description	Reference
IGCC – Integrated Gasification Combined Cycle Commercial operation at Texico-Tampa	Using a dry coal feedstock, the process involves gasification, cooling and purification (during which steam is produced which feeds a steam turbine), the production of fuel gas, which is then used in a gas turbine to produce electricity. Hot exhaust gases from the gas turbine are used to heat the steam in the steam turbine.	Submission IPRH#42 containing advice from the CSIRO paper *IGCC concepts for Australian coals and conditions,* June 2004 and overheads from DUT.
IDGCC – Integrated Drying and Gasification Combustion Cycle Pilot plant operated 100 MW scale demonstration plant proposed for 800 MW PS proposed for full operation by 2012	In this process brown coal is first dried and then converted to a combustible gas in a fluidised bed gasifier. The gas is cleaned of impurities and burned in a gas turbine to produce electricity. The hot exhaust gas from the gas turbine is then used in a boiler to produce steam, and this steam is used in a steam turbine to produce additional electricity. A shift reactor and scrubber are extras to provide for geosequestration.	Submission HRL#6 by Dr Terry Johnson See also IPRH#42 HRL#15
AIDG – Advanced Integrated Drying and Gasification System $180 Million Demonstration plant at Hazelwood possible Pilot scale testing has not been done	Uses an oxygen blown gasifier, scrubbing, and fuel gas production. A single cycle gas turbine is used, with exhaust gases being used to reheat the fuel gas. With the incorporation of a shift reactor and cryogenic separator, liquid CO_2 can be separated from the gas stream. The process would not require water consumption.	IPRH#42 HRL#19
CRC Clean Power from Lignite — MTE Proven at pilot scale, proceeding to large pilot scale, possibly late 2004	Process perfected at laboratory scale to mildly heat and squeeze brown coal, removing 70% of the water in the coal. The technology needs to be tested in a pilot plant, and can be used with existing or new generation power stations	Submission by the CRC Report in The Age 4 August 2004

In the closing address at the end of the initial hearings on behalf of IPRH, Mr Barton Napier cautioned that the tabled submission IPRH#42 (Comparison of AIDG and AIDGCC Cycles) was only provided to give a picture of what may happen in the future, and that any AIDG technology was "a long way out".

The costs of power production from the various new technologies vary slightly between the authors of those cost Estimations. There was general agreement between the estimates, as shown in Table 9, which also includes estimates for efficiency, cooling water consumption and coal consumption.

Table 9 Costs for base load electricity generation

Source	Cost $/MWh	Reference	Efficiency %	Cooling Water consumption tonne/MWh	Coal consumption tonne/MWh
Existing Hazelwood Power Station	$25	Verbal advice from Dave Quinn to the panel; HRL#15 quoting SECV 1992	24	2.51	1.47
2003 average spot price	$23	IPRH#2 quoting NEM Economics	N/A	N/A	N/A
New IDGCC (Brown Coal)	$28 to $34	HRL#19 quoting ACIL Tasman, SKM, CRC IPRH comment that coal winning costs could be under-estimated	41	0.84	0.86
Anticipated post 2010 new brown coal	$41.30	MMA	N/A	N/A	N/A
Existing CCGT	$40 to $45	Verbal advice from Dave Quinn to the panel — included for comparison purposes	N/A	N/A	N/A
Wind	$61.90	MMA — included for comparison purposes	N/A	N/A	N/A

The possible timing of the introduction of new brown coal technologies is also a critical factor in assessing the merits of new technology and understanding how the new technologies might contribute to future supply.

The HRL IDGCC process is the only technology which has progressed beyond the pilot stage, has competitive generation cost estimates, expected efficiencies in coal use and water use compared with existing Latrobe Valley power stations, and relatively firm timelines for implementation. It is expected that a 100MW demonstration plant will be built and operating by 2007, and the 800 MW plant would be built in two stages, the first 400 MW to be operational by 2010 (running on gas) and converting to coal in 2012 when the second 400 MW is commissioned.

At the reconvened hearings, additional information on new technology was tabled.

GTL Energy Limited provided considerable advice on the development of its coal drying technology, and similar advances overseas. GTL pointed to the very considerable reserves of brown coal worldwide, and the opportunities for new technologies to be applied beyond Australia.

GTL Energy Ltd has an agreement with International Power to implement a prototype coal upgrading (drying) unit at HPS by the 4th quarter of 2005. While the GTL drying process might relatively easily remove 50% of the water in brown coal, such large reductions would make the resultant coal unacceptable as feedstock for the existing HPS boilers. GTL (and IPRH) anticipate that a 5% reduction in water content might well be the practicable limit for burning in HPS without major expenditure to redesign the boilers. The planned testing will provide further information o this issue.

7.4 POLICY CONSTRAINTS

Impediments to a fair market price for electricity have been raised from all sides. Those advocating greater use of demand management, end use efficiency and renewable energy sources have pointed to the current low cost of electricity in Victoria. The arguments by EDO concerning the failure of the current market to cost externalities, including the true cost of water and the presence of 'perverse subsidies' have already been outlined in Section 7.2.2 above.

There is support for some of these views by those providing evidence on behalf of IPRH. For instance, the MMA Report states (page 41):

> *"The barriers to the development of demand side programs are well known. Such programs would require higher electricity prices in the market which are not currently in prospect. This means that there could be delays in the market development for such programs and participation could be less than anticipated. One would expect that if the Government chose to not extend the life of Hazelwood it would need to get quite serious about promoting alternative measures such as demand side efficiency."*

In relation to the barriers to new cogeneration plants, the MMA Report states (page 41):

> *"However there are a number of projects which have been considered which are not proceeding because of the currently low pool prices."*

Mr Dave Quinn, CEO of IPRH, tabled a copy of his recent paper to the 15th Annual National Power Conference entitled "Investing in new Generation Capacity" (IPRH#46). In it he made the following point:

> *"Forecasts of new capacity requirements based on ensuring system reliability in the face of significant projected demand growth have led to growing concern amongst Governments about the ability of the market to deliver the required new capacity."*

Mr Dave Quinn also advised the Panel that 250 MW of the 500 MW Pelican Point CCGT Power Station was mothballed because it could not compete on the NEM. He stated that: "*We need economic instruments to change the way the market operates.*"

The comments of MMA in the Executive Summary are also telling, where it is stated:

> *"By 2010, the existing accessible brown coal resources will have been consumed and run-down of mine production would commence by 2009 if no action is taken. Whilst the*

production profile could maintain full production until 2009 and close down within one year, to minimise financial losses, IPRH might consider reducing production much earlier to force up market prices to reflect the constrained fuel supply. In respect of the NEM, this scenario represents a "best case" where the reduced production would signal the need for new capacity and facilitate orderly changeover to new power supplies over several years."

7.5 DISCUSSION

The supply and demand scenarios provided by MMA may be criticised on a number of grounds. The main aspects that concerned the Panel were:

- projections for the future were made on the basis of "business as usual", without any allowance for the economic impacts likely to arise from government's response to the issue of greenhouse gases;
- the MMA projections of Sent Out Generation shows a 1.25% compound increase for Victoria over the years 2004 to 2015, compared with the 2.5% growth in demand predicted by NEMMCO for the 9 years from 2004/05 to 2013/14 (Victoria and South Australia Summer Outlook), and the VENCorp target of 2,050 MW new capacity by 2013, representing a 1.5% to 2.3% growth;
- the absence of any realistic contribution in forgone demand, as distinct from demand side efficiencies, in the predictions for the case with Hazelwood Shut Down;
- the lack of accounting for the quite long lead times for strengthening inter-state transmission interconnections and gas supply infrastructure.

The Panel notes MMA's caution that the analysis is not based on a full market simulation. Further, the Panel understands that some of its concerns listed above may increase the demand projection, and others decrease it. Clearly taking Hazelwood out of service in 2009 (with the possibility of reducing its output prior to that date) would have a dramatic influence on Victorian electricity prices.

The recent advice from NEMMCO that the combined Victoria/South Australia region is showing a reserve deficit for summer 2004/05 against reliability standards, and from 2006/07 onwards, provides evidence that the current supply of electricity in Victoria is stretched.

On the alternative scenario offered by EDO, the Panel notes that while it provides for the replacement of the Hazelwood electricity generation, it does not address the increase in demand anticipated. Significant new generation capacity (over 2000 MW) will be needed by 2010, before any new technology is available commercially, and with the buffer of aggressive demand management and increased use of renewables already factored in to the replacement of Hazelwood, no provision for the increased demand has been allowed in the EDO alternative scenario. The reductions in electricity supply resulting from efficiencies described by Alan Pears are very significant, and well worth intensive government action. While a number of submittors stated that market measures provide more efficient outcomes than regulation, none offered any evidence to rebut the positive (though small) contribution made through the regulation of the Victorian building industry to achieve better thermal protection and consequent energy savings.

Although the Panel saw deep cuts in energy efficiency as desirable, other submittors pointed to two aspects that militate against energy efficiency alone delivering substantial savings in

the short term. The first of these has been described as "bounce" (or "rebound", as it is described in the Allen Consulting Group report), the capacity for human factors to translate savings in energy costs into other activity, which itself then requires more power. The second is the relatively small percentage of overall costs that electricity supply represents in many business activities, and cited as being typically only 2% or so. Such relatively small electricity costs also militate against business aggressively adopting demand management measures.

The Panel saw many of the economic arguments advanced by EDO (see Section 7.2.2) to be sensible and practical measures. Having heard evidence from IPRH about the local content in the maintenance and refurbishment of Hazelwood Power Station, the Panel was not convinced of the merits of EDO's argument on point (vii a) — job opportunities in the renewable energy sector. The Panel, however, viewed the economic arguments not as reasons for retiring Hazelwood, but rather as matters which should be generally be supported to provide a smoother transition to the future. The issue of 'perverse subsidies' were also of concern to the Panel.

In respect of new technologies, the Panel formed the view that the introduction of new technologies would extend over a considerable time frame. While positive research results are most encouraging, there are numerous examples where the transition from research to commercial reality takes longer than expected, and sometimes does not happen at all. The Panel agreed with IPRH that on the evidence presented, new technologies were unlikely to provide a significant boost to electricity supply before 2010.

Efficiencies through coal drying may, however, be able to be retrofitted to existing power stations before that date. Such retrofitting at Hazelwood Power Station may require modification or replacement of the boilers, particularly where large reductions in moisture content are sought. It is relevant here to note that DPI advised in their submission on the exhibited documents that:

> *"The Minister for Energy Industries and Resources has advised IPRH that new mining licences for the proposed West Field project would not be granted until the company commits to further investment that reduces GHG emissions from the existing Hazelwood Power Station."*

On the issue of policy constraints, the Panel accepted the arguments of both IPRH and some of those who objected to its proposal, that the operation of the NEM and the suite of present government policies and subsidies provide neither sufficient incentive to lead to the provision of needed additional base load power generation, nor the prudent increase in all forms of demand management and renewable energy initiatives.

7.5.1 CONCLUSIONS ON FUTURE ELECTRICITY NEEDS

Given the lead time for alternative technologies, the absence of significant demand management in an environment of low electricity prices, and the expected increase in annual electricity demand, the Panel concludes that the IPRH proposal for the West Field development is the most economical alternative for the supply of base load electricity to Victoria and the National Electricity Market.

The Panel commends the Government for its initiatives with respect to new technologies and the granting of exploration licences in conjunction

with defined investment programs for new technology research and implementation.

The Panel concludes that Government should intensify its promotion and the use of economic incentives to achieve a significant strengthening in demand management, and should seek the review of the operation of the National Electricity Market to ensure that its objectives lead to a balance between:

- **ensuring the National Electricity Market enjoys a secure, clean and reliable base-load electricity supply well into the future; and**
- **maintaining competitive electricity prices for domestic and business consumers.**

7.5.2 RECOMMENDATION ON FUTURE ELECTRICITY NEEDS

The Panel recommends that the Government should:

- **intensify the promotion and provision of economic incentives to achieve a significant strengthening in demand management; and**
- **seek a review of the operation of the National Electricity Market to achieve a balance between:**
  - **ensuring the National Electricity Market enjoys a secure, clean and reliable base-load electricity supply well into the future; and**
  - **maintaining competitive electricity prices for domestic and business purposes.**

8. THE MOST EFFICIENT USE OF BROWN COAL

*"Is the proposal the most efficient use of the Gippsland brown coal resource? (*EES, Section 3*)*

8.1 INTRODUCTION

This Chapter of the report addresses the regional brown coal resource, IPRH's coal requirements, and the IPRH mining proposal.

Issues concerning new technology have been addressed in Chapter 7 above, while mine and river alternatives are considered in Chapter 9, and the issue of the interface with HRL is discussed in Chapter 10.

8.2 THE BROWN COAL RESOURCE

In its response to the Panel's Direction 2(a), DPI responded in part:

> *"It has been conservatively estimated that the State's recoverable reserve of brown coal is 35–49,000 million tonnes. This represents over 500 years supply at current energy consumption rates. Presently there are three mines and four brown coal fired power stations. Each mine has a separate mining licence. DPI believes that given the scale and quality of the State's resources, its economic potential is not being fully utilised at the present time."*

DPI also advised that:

> *"In order to protect the brown coal resource from the practice of securing exploration or mining licences without genuine intent to work the licence, the Victorian Government has applied an exemption under section 7 of the Mineral Resources Development Act 1990."*
>
> *(*The exemption area is shown in Figure 3 above in Section 3.2.2*)*

The presentation to the Panel made by Guy Hamilton of DPI included a computer generated plan of the Latrobe Valley coalfields used in the Brown Coal Tender Process, which showed the coal resource with different colours representing different coal to overburden ratios. The areas including the existing Yallourn, Hazelwood and Loy Yang mines, and the new areas over which exploration licences have (or are in the process of being) granted are shown as the brown coal resources with the most favourable brown coal to overburden ratios — the better brown coal resources.

Alan Moran of the Institute of Public Affairs told the Panel of his view that the energy efficiency of individual plants in the Latrobe Valley was not a major issue, as there is so much brown coal.

DPI also advised of the Latrobe Valley 2100 Coal Resource Project, which will "…*develop a strategy to guide planning and sustainable mine development practices for brown coal in the Latrobe Valley*". The study is to be complete by 31 December 2004.

8.3 IPRH'S COAL REQUIREMENTS

When IPRH bought Hazelwood Power Station and Mine for $2.4 billion in 1996, it also acquired mining licence MIN5004. Mining Licence MIN5004 covered a volume of coal said to be sufficient to support the 40-year life of the business contemplated at the time of purchase. The Hazelwood Power Station was designed to burn coal from the Morwell 1 Seam.

The mine plan at the time of purchase provided for the winning of coal from the South East Field only, with sufficient reserves until 2005. The mining method was based on bucket wheel excavators and conveyor systems operating in a block arrangement. Access to the remaining coal reserves within the mining licence was further constrained by the mining licence reflecting land title boundaries, rather than the underlying coal resource; the Second Morwell River Diversion (which quarantined some 240 million tonnes (**Mt**) of coal); and to the north west the overlying Yallourn Seam Coal (some 50 Mt) which cannot be used in the Hazelwood Power Station.

Fuel supply options were investigated by IPRH, and these are outlined in the EES. They were gas, Loy Yang coal, more efficient use of existing reserves (e.g. coal drying technologies), and mine development options (north, northeast, east, south and west). IPRH concluded that development of the mine westwards was the most economic and feasible option.

West Field development was facilitated by approval of a change to the mine plan in 2001 to allow mining of West Field Phase 1,which included Blocks 1A and 1B (see Figure 2 in Section 3.2 above) and allows coal supply to be maintained up to 2009. IPRH have recently commenced winning coal from the West Field Phase 1 area.

IPRH have established that the West Field has a definitive mining reserve of 495 Mt. This figure does not allow for the constraints imposed by the requirement for mining efficiency. It would, however, support IPRH's contention that the coal contained within the mining licence is sufficient to allow the Hazelwood Power Station operation until 2031, on the basis that mining commenced in West Field Phase 1 in 2004, and at 18Mt per annum, the reserve would last a further 27½ years. The 18Mt per annum figure makes some allowance for the continued supply of coal to Energy Brix Australia Corporation (EBAC), which amounted to some 1.6 Mt in 2003. The stripping ratio of the West Field development is extremely favourable, with 5.4 tonnes of coal won for every cubic metre of overburden removed.

The new mining licence proposed seeks to extend the existing mining licence to allow IPRH to mine sufficient coal in a block arrangement to provide for their needs to 2031. The proposal does not preclude IPRH from winning further coal in the future from within their existing mining licence area, which is presently not commercially attractive. This would include areas presently covered by overburden or by the overlying Yallourn Seam coal, or in unmined remnants by using mining methods other than block arrangements with bucket wheel excavators.

The shape of the West Field Phase 2 mine proposal is influenced by a very large fire-hole in the area occupied by proposed spoil mounds 2 and 3 (see Figure 2).

Should the proposed river diversion be approved and built, IPRH could still win a very considerable part of the coal within the existing mining licence, sufficient to fuel the Hazelwood Power Station until 2026, though with additional mining costs.

The Morwell 1 Seam Coal to the north west of the existing Hazelwood open cut may also be mined by IPRH in the future. It is overlain by Yallourn 1 Seam Coal, which would be treated as overburden. As noted in Section 7.3 above, IPRH are also involved with the Coal to Liquids Project with the Adelaide based company GTL Energy Limited. Should this project proceed, the Yallourn 1 Seam Coal from the northwest extension of the Hazelwood open cut would not be wasted.

8.4 DISCUSSION

In assessing the most efficient use of the brown coal, a number of aspects need to be considered. These include consideration of the current situation, the future, the quantity of total reserves, the utility of these reserves, and the commercial expectations of present holders of mining licences.

From the perspective of the current situation, and as discussed in Chapter 7 above, it is clear to the Panel that the absence of proven more efficient technology that can be reliably and commercially implemented in the short to medium term means that continued burning of brown coal at Hazelwood is necessary as part of the mix in the supply–demand equation for Victoria.

From the perspective of the future availability of brown coal, it is clear that the resource is massive. However even massive resources can be depleted by rapacious over-development, and a balance needs to be struck between the needs of the present generation when compared to the needs of future generations.

The Panel also notes that the coal targeted for use has a very favourable coal to overburden ratio, while a considerable part of the remaining reserves do not have such a favourable ratio. Economic efficiency supports the early use of the most economic coal; in the future mining technology and cost structures may make this issue less important.

In relation to the expectations of the holder of a mining licence, the Panel recognises that IPRH's expectation that it be allowed to continue to use the coal within the mining licence area is legitimate. In February 1999 IPRH sought a determination from the government on its position in relation to extending the Mining Licence. The DPI response, endorsed by the then Minister, on 6 May 1999 included the advice that:

> *"After careful consideration of your submission, I advise that I can think of no reason why the Government would oppose extension of your mining licence area as indicated."*

That expectation should not be seen as unfettered, however. Industry in general is expected to continuously improve its efficiency and environmental performance, and mechanisms such as Environmental Improvement Plans are commonly used to achieve continuous improvement. EPA also requires action under its PEM - Greenhouse Gas Emissions and Energy Efficiency in Industry from existing licence holders. IPRH have commenced this process with EPA for Phase 1 of West Field, and will address the PEM for Phase 2 "in due course". The separate process being undertaken between IPRH and the Minister for Energy

Industries and Resources to consider greenhouse gas emissions can be viewed in this light, and is further discussed in Chapter 18.

8.4.1 CONCLUSIONS ON THE MOST EFFICIENT USE OF BROWN COAL

Taking into consideration the current and future needs, the size of the brown coal resource, and the opportunity for increased efficiency from Hazelwood in the future, the Panel concludes that the proposal is an appropriate use of the Gippsland brown coal resource.

9. RIVER DIVERSION AND MINING OPTIONS

9.1 RIVER DIVERSIONS

There is a long history of Morwell River diversions to enable coal mining in the Latrobe Valley. A brief description of the various diversions, both constructed and proposed, is provided below in Table 10.

Table 10 A description of the Morwell River diversions

Key	Title	Description	Cost
MRD1	Yallourn Mine South Field Diversion	A I km diversion undertaken by the SECV	
MRD2	Hazelwood Mine South West Field Diversion	A 4 km diversion undertaken by the SECV in 1977, comprising a 3 m diameter low-flow concrete pipe beneath an open high-flow grassed channel.	
MRD3	Yallourn Mine East Field Diversion	A 4 km diversion undertaken by the SECV in 1987, comprising a 3 m diameter low-flow concrete pipe beneath an open high-flow grassed channel.	
MRD4	Yallourn Mine Maryvale Field Diversion	A sinuous low flow stream bed within a wider flood plain on embankment through the Hazelwood mine on an unmined coal dyke, and presently under construction.	
MRD5	Proposed Hazelwood Mine West Field Diversion	A sinuous low flow stream bed within a wider flood plain on cut and fill to the west of MIN5004.	$60 million
MRD6	Possible future Hazelwood Mine Eastern Diversion	A possible future diversion immediately to the east and north of the Hazelwood Open Cut,	$300 million
MRD-DE	Proposed Driffield Project Eastern Diversion (Major Morwell River Diversion)	The SECV's preferred Major Morwell River Diversion. It is protected in the La Trobe Planning Scheme, and involved an open channel and flood retarding basins on most tributaries. Doubt has been raised about its current environmental acceptability.	$500 to $700 million (*indexed to 2003 dollars*)
MRD-DW1	Proposed Driffield Project Western Diversion	An open channel and tunnel option proposed by the SECV to the west of the proposed Driffield Open Cut	$2.4 billion (*indexed to 2003 dollars*)
MRD-DW2	Proposed Driffield Project Western Diversion	An open channel and land bridge option proposed by the SECV towards the western	$1 billion (*indexed to*

		side of the proposed Driffield Open Cut	*2003 dollars*)

Figure 10 shows the general alignment of these various diversions.

Figure 10 Existing, proposed and possible Morwell River diversions

The proposed Fifth Morwell River Diversion (**MRD5**) will provide access to the coal below the existing Second Morwell River Diversion (**MRD2)**.

It should be noted that MRD2 quarantines some 240 Mt of coal, while MRD5 quarantines some 412 Mt of coal. Clearly river diversions that do not quarantine useable coal are to be preferred.

The EES outlined two concepts prepared by IPRH for land bridges across the void of the Hazelwood mine, and concluded that on a mixture of cost and risk grounds neither option was practicable. A further diversion, MRD6 was found to be practical in the long term. It involved an excavation into the natural surface around the southern, eastern and northern batters of the Hazelwood mine, with a relatively small levee across the mine outlet currently being constructed for the West Field. MRD6 would require some 48 million cubic metres of material to be excavated over a period of 9 to 12 years. Thus, while it is practical in the long term, it is much more expensive than MRD5, and it could not be constructed in time to guarantee continuity of coal supply to the Hazelwood Power Station.

IPRH explained the circumstances in which MRD6 might be constructed in the future as involving the desire to mine the otherwise quarantined coal under MRD5 by either IPRH, HRL or another party, proceeding either as a westward expansion of West Field, or an eastern expansion of a new Driffield open cut.

A similar Morwell River diversion to MRD5 had been proposed around Yallourn Open Cut for the Maryvale Mine expansion, and was indeed the subject of an EES and Panel Hearing in 1999. In that case, following the approval of the river diversion, a Design and Construct tender led to a successful bid by Thiess Roche Linfox (**TRL**) for a different diversion of the Morwell River through the Yallourn Open Cut (MRD4). As reported in Section 2.3 the Panel

made an inspection of the construction of MRD4 at the Yallourn mine. In the knowledge of this development the Panel was keen to test whether the two rejected options through the Hazelwood mine had been rigorously examined, and sought further advice from IPRH. The Panel also sought further advice on the construction period for MRD6, which seemed unnecessarily long.

IPRH and RTL provided considerable further information on both issues. The key points made in relation to the options were:

- the poor bearing strength of Latrobe Valley clays, the wet conditions experienced in winter and the confined nature of the proposed embankments through the Hazelwood mine severely limit the volume of material that can be handled in a year. RTL's experience in constructing MRD4 was that the average annual production for the last three years was just under 4 million cubic metres of cut to fill. A seasonal record was achieved by RTL on the Hazelwood Overburden Project in 2002–03, where just over 7 million cubic metres was moved in a very dry season;
- MRD2 had a maximum embankment height of 40 m and was firmly anchored on an undisturbed coal dyke.

Option 6(a) Land bridge across mine at South West Field pivot

- The 90 m high embankment, 2.5 km in length, would require 117 million cubic metres of fill, and 2 – 3 million cubic metres of sand or crushed rock for filters. Overburden from the entire West Field would only provide 50 – 60% of the required material, and the remainder would need to be sourced from existing overburden dumps and externally, at great expense.
- An annual rate of 29 – 30 million cubic metres per year would need to be achieved to construct the diversion before 2009, when coal from under MRD2 is required. Such a rate is unachievable.
- Operational limitations including the exposure of West Field coal and attendant fire risk, and the high (though unquantified) costs. These can be expected to be considerably greater than the $470 million estimated for Option 6(b) below;
- Unacceptably high risk of failure, and the potential for significant settlement under seismic events.

Option 6(b) Land bridge across the mine at the ash storage facility

- The 70 m high embankment, 1.5 km in length, would require 66.5 million cubic metres of fill, and 110 million cubic metres if 10H:1V batters were required for structural stability.
- An annual rate of 16 – 18 million cubic metres per year would need to be achieved to construct the diversion before 2009, when coal from under MRD2 is required. Such a rate is unachievable.
- Operational limitations including the exposure of West Field coal and the attendant fire risk, and the quarantining of the Office Field coal.
- The high cost, estimated at $470 million;
- Unacceptably high risk of failure, and the potential for significant settlement under seismic events.

Option 6(c) Diversion around the perimeter of the mine

- MRD6(c) would require construction of an open channel with an average depth of 20m (up to 30 – 40 m deep in some places) and an embankment adjacent to the mine outlet.

Some 44 million cubic metres of material (including 10 million cubic metres of coal) would need to be excavated.

- An annual rate of 11 – 12 million cubic metres per year would need to be achieved to construct the diversion before 2009, when coal from under MRD2 is required. Such a rate would be extremely optimistic, given RTL's experience with similar projects in the Latrobe Valley coalfields. A more sensible (most likely) earthworks rate would be 9½ million cubic metre per year, requiring a construction period of 5 years, plus 2 years for approvals and design, and a further year for bed stabilisation, eight years in all;
- The cost of the diversion would be $242 million, excluding the set up costs and costs associated with infrastructure relocation.

9.2 MINING METHOD

The Panel was aware that at the Yallourn Energy mine, the traditional coal winning method using coal dredgers has been replaced to a large extent by a new method using large dozers which push the coal to a feeder breaker, which loads it onto the face conveyor on a bench below the coal face.

The EES detailed that IPRH would continue with coal winning using its current bucket wheel excavators (BWE) and conveyor system. In view of the apparent economies found by TRL at Yallourn using dozers, the Panel sought additional information from IPRH on the relative merits of the two coal winning methods (Direction 2(d)).

In reply, IPRH set out several significant differences in the two operations, which bear on the choice between BWEs and dozers, as follows:

- The Yallourn mine is approximately 60 – 70 m deep, while the Hazelwood mine is 130 – 150 m deep;
- Three of the Yallourn coal BWEs are approximately 20 years older than the five Hazelwood BWEs, two of which are of a more modern design based on hydraulic controls instead of cable pulley systems;
- Yallourn Energy continues to operate two BWEs one for overburden removal, and one to augment coal supply.

While the dozer operation offers some advantage in flexibility and capital cost for new plant, the BWEs are electric powered (compared with diesel fuel for the dozers), have a longer life, and do not have a reduced output in the higher coal faces.

A final argument advanced by IPRH for their decision to stay with the BWE operation is that the well-maintained BWEs have a book value of $82 million. A transition to dozers would require this to be written off, with a reduction in before tax earnings during the write off period. This would be unacceptable to IPRH and its mortgagors given the less than expected returns from the National Electricity Market.

IPRH has sought quotations for the necessary plant and equipment for the dozer push operation, and has determined that the operating and maintenance costs of the BWEs operations were approximately 80% that of the dozer push operations.

IPRH did however note that given the high initial capital cost of coal BWEs, it is anticipated new mine developments will be based around dozer push operations or similar loading onto face conveyors established on benches arranged in regular blocks.

9.3 DISCUSSION

The Panel approached the issue of the Morwell River diversion with feelings of dismay that so many temporary diversions had been proposed and constructed over time, and more were being proposed in relation to the present mine extension. The Panel hoped for some more global approach to the issue, whether by government, or by a combination of all parties.

As a more careful analysis of the options was understood, it became clear that any "global" solution such as the Major Morwell River Diversion proposed by the SECV would not be a wise investment strategy (nor particularly environmentally sensitive). Even comparing MRD5 with MRD6(c), the cost difference ($60 million compared to $300 million) makes further consideration of MRD6(c) irrelevant. The saving of $240 million, invested now, might well be worth $1 billion by the time it is required to be built.

The Panel accepts the logic of the arguments advanced by IPRH in respect to the various potential river diversions, and agrees that on cost grounds alone, MRD5 is to be preferred.

On the issue of the mining method, the Panel understands the arguments presented by IPRH, but suspects that a change in IPRH's mining method may come more quickly than anticipated. Part of the flexibility associated with the dozer operation is that it may enable pockets of coal that would otherwise remain unmined from the regular blocks associated with BWE operations to be mined. Additionally, the dozer operation will leave a face already battered at a 3 or 4 horizontal to 1 vertical, ready for topsoiling and rehabilitation, in contrast to the stepped profile left by BWE operations.

9.3.1 CONCLUSIONS ON RIVER DIVERSION AND MINING OPTIONS

The Panel endorses the selection of MRD5 by IPRH in favour of other possible river diversions. In relation to the mining method, the Panel accepts that it is presently economic to maintain the bucket wheel excavator operation, and notes that a shift to partial dozer operations is likely as new plant is required.

10. INTERFACE ISSUES WITH HRL

10.1 IPRH'S INTERESTS

10.1.1 KEY COMMUNICATION S

During IPRH's planning period for the extension of its Hazelwood mine to the west, DPI invited tenders for Exploration Licences in the Latrobe Valley, including exploration licences over the Driffield coal field (It should be noted that there are in fact two Exploration Licences involved: the first, EL4685 covers most of the Driffield area to the west of the Hazelwood Exclusion Zone, and has been granted, while the second covers about one square kilometre of Crown land and cannot be granted until Native Title issues have been resolved). That Exploration Licence was won by HRL. IPRH's proposed location of the Strzelecki Highway deviation and MRD5 is partly within IPRH's Mining Licence next to the boundary with the HRL Exploration Licence, partly within the proposed new IPRH Mining Licence, and partly within the HRL Exploration Licence.

Figure 11 shows the location of the proposed road and river diversions in relation to the boundaries of IPRH's Mining Licence ML5004 and HRL's Exploration Licences EL4685 and EL4686.

IPRH provided a detailed chronology of information they provided to various parties about their plans for the West Field, from February 1999 to the present time. Some of the key events listed by IPRH are shown in Table 11 below, with Panel comment on the content of the communications.

Figure 11 The IPRH and HRL interface

Table 11 Selected chronology of Key milestones and IPRH communications

Key milestone	Date	Content	Panel comment
IPRH seeks Government position on access to additional coal	4 Feb 1999	Plan including drawing showing proposed road and river alignments	The alignment for both the Strzelecki Highway and the Morwell River Diversion were subsequently adjusted by IPRH.
Local newspaper articles	14 Oct 1999	Project announced publicly	No indication of the direction in which the mine might expand was given.
Brown Coal Tender	6 Oct 2001 – 24 Jan 2002	The area allowed for the 'Driffield' Exploration Licence used the boundary of the Morwell River Diversion nominated by IPRH in Feb 1999	
Tender Assessment Period	25 Jan 2002 – July 2002		
IPRH request to extend the Hazelwood Exclusion Zone	25 March 02	Letter and new plan sent to Government (Minerals and Petroleum Victoria), based on Option 2K	IPRH sought both the adjustment of the previously advised boundary, and the grant of a mining licence.
DNRE advice of no change to Hazelwood Exclusion Zone	15 Apr 2002	No change during tender period 'for probity reasons'	
Tender announcement	July 2002	Area of interest boundary followed the proposed 1999 river diversion alignment	Exploration licence 4685 issued 3 June 2003, EL 4686 (for the equivalent of I sq. km. of Crown land) awaiting Native Title resolution.
HRL–IPRH meeting	19 Nov 2002	IPRH reported that HRL indicated a desire to licence the use of their technology, not to operate a mine and power station.	IPRH stated that they showed HRL the aerial photo with road and streams overlay.
IPRH request for an EES	Dec 2002	Letter sent to Minister for Planning with plans attached.	The plans showed the proposed river diversion crossing the HRL EL boundary.
Further meetings between IPRH and HRL	Jan 2003– Jun 2004		
Letter to IPRH from HRL	16 Dec 2003	HRL expressed concerns about IPRH proposal	

The Panel sought information from DPI on the advice given to Tenderers concerning IPRH's plans for West Field. Written advice from DPI to the Panel (DPI#4) included the following:

> *"In summary, there is no clear evidence that tenderers were provided with information relating to the plans of IPRH in regard to its plans for the diversion of the Morwell River, the Strzelecki Highway and Eel Hole and Wilderness Creeks either before or during tender. Nevertheless, both the Department and IPRH have been providing information to HRL for some considerable period and well before the grant of the exploration licence at which point significant financial commitments by HRL would begin. The Department has been assured on a number of occasions by IPRH that it was in discussions with HRL and that HRL was receiving all the documentation being tabled during the course of the EES process (i.e. Draft consultants' reports). And finally, in September 2003 DSE and DPI briefed HRL in full on the developing situation in the West Field EES.*
>
> *The department is aware of the concerns held by HRL in regard to the IPRH diversion proposals. Nevertheless, despite the information provided to it over a considerable period of time, HRL has chosen to persist with the exploration licence."*

A longer extract from DPI#4 is provided in Section 10.5.3.

10.1.2 IPRH's RIGHTS

IPRH, or any other party wishing to mine brown coal, cannot commence mining without a Mining Licence, and a Work Authority, previously described in Section 3.3.2. Under the terms of sale of the Hazelwood Power Station and mine to IPRH, IPRH have the right to seek one amendment to their Mining Licence, and the present process is addressing IPRH's proposed Mining Licence application.

With respect to infrastructure, neither an Exploration Licence nor the Latrobe Planning Scheme provisions prevents IPRH from seeking to locate infrastructure outside their Mining Licence area. IPRH cited the following recent examples of infrastructure traversing another party's Exploration Licence:

- the gas supply pipeline to power stations owned by Edison Mission (Loy Yang B) and Valley Power going across both Loy Yang Power Management Pty Ltd and Australian Power and Energy Ltd (**APEL**) Exploration Licences;
- the Basslink HVDC Interconnector going across the APEL Exploration Licence.

IPRH maintains that the Brown Coal Tender process has disadvantaged it (and indeed HRL as well), by upsetting the orderly and sequential development of the brown coal resource specified in the Latrobe Planning Scheme, and causing the present boundary dispute.

During the Panel process, EDO made a number of submissions to the Panel, including EDO#10, entitled "Positioning Victoria to Prosper in a Carbon Constrained Economy". A copy of the HRL Exploration Licence was attached as Appendix 2. The Licence included some background information and advice that:

> *In assessing any Mining Licence Application(s), the Department will consider the following matters:-*
>
> - *Applications for mining licences would only be considered where key milestones set for exploration licences had been achieved or were likely to be achieved.*
> - *Should HRL Developments Pty Ltd ultimately share a common mining licence boundary with Hazelwood power or another party, arrangements should be put in place to as far as possible ensure complete coal extraction across the boundary.*

- *Total emissions for the proposed new power station should not exceed the lower of 0.82 tonnes of CO_2/MWh or world's best commercial practice at the time of plant design finalisation.*

IPRH stated that they had no previous knowledge of the HRL Exploration Licence condition that sought complete coal extraction across any common boundary.

In response to HRL's request that MRD5 be moved further to the east, so that there is no impact resulting from it on HRL's Exploration Licences area, IPRH advised that such a move would:

- reduce the economics of the current West Field project;
- bring forward IPRH's decision on MRD6(c) to 2014, instead of 2018;
- decrease the opportunity for IPRH to benefit or contribute to MRD6(d);
- still quarantine about 340 Mt of coal.

10.1.3 THE DRIFFIELD SUPERPIT

IPRH outlined to the Panel the concept of a Driffield superpit option. Were IPRH and HRL able to reach agreement, IPRH could supply coal to HRL, by extending the West Field into the Driffield mine area. This would require the relocation of MRD5 and the construction of MRD6 in perhaps 2020.

IPRH made clear that it is not interested in financially backing HRL's IDGCC project. Nor is IPRH interested in going directly to the superpit option, as planning for the West Field is too advanced, and the timelines for moving MRD2 are too short.

IPRH stated that approval of the West Field development would not preclude a later decision to mine a superpit, or access the coal resources temporarily quarantined by the proposed MRD5. Such a decision could be made when HRL secures investment backing for its proposed development.

It should also be mentioned that IPRH drew attention to work done by the SECV for the Driffield Power Station, where the bedding and jointing of coal in the north of the Driffield mine were seen to present stability problems if mined from the west. The SECV planned the development of the Driffield coalfield to commence with a face in the south east corner, with mining proceeding northwards and eastwards.

10.2 HRL'S INTERESTS

In relation to the rights conferred under HRL's Exploration Licences, Mr Lonie advised the Panel in his closing submission of the relevant wording of the Request to Tender documentation, as follows:

> *"Any successful tender will be awarded in accordance with the purpose of the [Mineral Resources Development] Act, which is to encourage an economically viable mining industry which will make the best use of resources in a way compatible with the economic, social and environmental objectives of the State. Successful tenders will be initially awarded an exploration license or licences that will ensure exclusive access to the resource during the detailed assessment and approval stages for any subsequent mining and related development proposal. The exploration licenses awarded will confer*

on holders exclusive rights to subsequently apply for mining licences under which mining and related development can be undertaken. Tender bids will be awarded on the basis of the best use of resources, within the tender area and the strategic advantage to Victoria in terms of economic, social and environmental outcomes any proposed project will provide."

Clayton Utz on behalf of their client HRL made a written submission on the EES and other exhibited documents, in which they made the following points:

- *the granting of the Exploration Licences to HRL has been specifically for the development of a new 800 MW power station using the IDGCC process to reduce CO_2 emissions from power generation.*
- *the tenement area is approximately 46 km^2, with an estimated resource of approximately 394 Mt of brown coal.*
- *the IPRH proposal will directly impact on HRL and the tenement area. The impacts arise from:*

  a) *the proposed fifth Morwell River diversion which largely runs along the eastern boundary of the Tenement Area until a point north of Wilderness Creek where it crosses into the Tenement Area by more than 200 metres for more than 1 km of river length;*

  b) *the proposed Strzelecki Highway deviation which largely runs along the eastern side of the boundary of the Tenement Area until it reaches a point north of Wilderness Creek where it crosses into the Tenement Area and remains west of the diverted Morwell River;*

  c) *the proposed extension of IPRH's mine development to the west;*

  d) *creek diversion and road works south of the existing course of Wilderness Creek; and*

  e) *relocation of power lines and associated infrastructure, including a 22KV and 66KV transmission lines.*

Clayton Utz also drew attention to the fact that the coal with the most favourable overburden ration, and hence the most economical and valuable resource, is located in the north eastern corner of the Tenement Area which is directly impacted buy the IPRH proposal.

Clayton Utz also summarised the estimated impact on coal resources in the Tenement Area at between a minimum of 43 Mt and possibly in excess of 130 Mt, for reasons that will be discussed below. These estimated volumes were quite different to the IPRH estimates in the EES, where it was stated that MRD5 would temporarily quarantine between 8 and 44Mt of coal within HRL's exploration licence.

Clayton Utz raised concerns about the likelihood of further losses of available coal resulting from the need to provide a visual screen from the relocated Strzelecki Highway, and noise amelioration.

Clayton Utz submitted that replacement coal of an equivalent quality would cost $1.50 per tonne more than the $2.50 per tonne that it could be mined for. This would translate to economic losses, of the order of $64.5 to $196 million, and allowing for loss of profits or loss of opportunity, will result in a decrease in cash flow of the HRL Project of in excess of $1 billion.

Clayton Utz also raised issues of subsidence and movement of infrastructure, the Strzelecki Highway deviation, base load generation cost, inefficient use of coal resources, and

Greenhouse Gas Emissions (The last issue is outside the Panel's Terms of Reference, while the preceding two issues have been covered in Chapters 7 and 8).

In relation to the calculation of the potential loss of coal, Clayton Utz called a number of witnesses. These included Dr Robert Gaulton and Mr Kevin Dugan of BFP Consultants Pty Ltd as expert witnesses in geotechnical design factors, and Mr Ted Waghorne and Glen Reinsch of GHD as expert witnesses on the implications of the IPRH proposals to HRL's mine development.

The evidence of these experts is briefly summarised as follows:

- it is appropriate at this early conceptual design stage to use a factor of safety of 2 in calculating setback distances from the proposed MRD5;
- it is noted that IPRH have used setback distances of 200m along the entire length of both sides of the river diversion. Preliminary investigations indicate that the assumption is not justified, given the variation in geology, hydrogeology, material types and spatial factors;
- safe stand off distances were postulated to be 335 m, 280 m, 153 m and 120 m respectively for the northern part of the main mine (Section A), the centre part (Section C), the southern part (Section E), and within the south extension of the main mine (Section G). The Section references are shown on Figure 12.
- the application of these safe offsets would result in a reduction of in situ coal reserves of 37 Mt from the 388Mt otherwise available. Should the southern extension of the mine not be viable due to the location of MRD5 and the Strzelecki Highway deviation (and the southern extension is an area where the coal thickness and overburden ratio is not so favourable), the reduction would increase to 75 Mt, leaving 313 Mt available.

While a theoretical 313 Mt would be available even if MRD5 were constructed, and the southern area deemed uneconomic, this figure must be further reduced to allow for operational factors. Ted Waghorne suggested a further reduction of 40 Mt from the 313 Mt quoted above where the southern extension of the mine is considered uneconomic, leaving 263 Mt of winnable coal.

A further plan showing the potential longer term development of the Driffield coal field was provided by HRL to IPRH, and was tabled by IPRH (Exhibit IPRH#35). The plan is reproduced below as Figure 13. It is dated 3/1/2002, just before the close of the Brown Coal Tender period. It shows a Phase 1 of the Driffield Mine with 250 Mt of coal extending eastwards to the boundary of the HRL Exploration Licence, and a Phase 2 with a further 250 Mt of coal extending through the IPRH Mining Licence and Exclusion Zone to MRD2.

Clayton Utz also submitted that approval of the West Field project should either be conditional on MRD5 being subsequently moved, or IPRH should move their proposed MRD5 further east, so it has no impact on the HRL Tenements. In relation to the possible future MRD6(c), Clayton Utz noted that while MRD6(c) may afford an option for relocating MRD5, no allowance had been made by IPRH to carry out its construction or contribute to its cost, and instead IPRH seeks to shift this burden to HRL or to any other party seeking to mine the coal within the Driffield area.

Figure 12 Case 2 – Mining to safe offsets from the proposed MRD5

Figure 13 Driffield Development — HRL Plan

10.3 MRD 6(d)

Late in the Hearing process (Day 9), IPRH presented a new proposal for a possible Sixth Morwell River Diversion (Exhibit IPRH#39 — A Possible Win – Win – Win). IPRH explained how they had reviewed the interests of the parties, as follows:

- HRL say that IPRH's MRD5 prevents their access to the most favourable coal, and prevents them meeting their Exploration Licence requirement to ensure complete extraction of coal across the joint boundary;
- the State wants complete recovery of the coal resource and would like HRL and IPRH to cooperate in meeting this objective;
- moving MRD5 further east to avoid any HRL impact does not meet the State's requirement and is not a Win – Win solution.

The further option is MRD6(d), and is shown on Figure 14. It is a low cost variation of the western river diversions proposed by the SECV (see Table 10 above, Option MRD-DW1 and MRD-DW2). It has been generated on the basis that the Driffield field will be mined from the east, and the diversion will traverse through the mine pit in part.

Referring to Figure 14, MRD6(d) comprises three distinct construction zones:

- an all cut section connecting MRD5 at the inlet (Section A – A);
- an all fill mid-section across the floor of the HRL excavation (Section B – B);
- a cut section on a coal bench at the north end of the Driffield Mine, requiring clay covering to reconnect to MRD5 at the outlet end (Section C – C). To achieve the desired level by leaving a coal bench would appear to require the effective quarantining of 23 Mt of coal. This section of the alignment is potentially flexible and could extend around Yallourn Energy's Mining Licence area.

MRD6(d) is designed to be integrated with coal mining activities to minimise costs. Timing of the construction is dictated by the need to have excavated all coal between the northern and southern boundaries of the proposed Driffield Mine.

IPRH have provided preliminary estimates (prepared by RTL) for MRD6(d) of $98 million (in 2004 dollars), which includes an allowance for conveyor bridges and a mine access bridge to cross the diversion. Earth Tech has also undertaken preliminary hydraulic modelling, which shows that MRD6(d) is hydraulically preferable to MRD6(c).

IPRH have also estimated the amount of coal temporarily quarantined by MRD5, and which would be accessible if MRD6(d) was constructed. On the basis of the same stability offsets as adopted by HRL (see 10.2 above), and extended northern and southern limits of the mine, the volume is 340 Mt.

IPRH have advised that it would be prepared to enter into an MOU with HRL and the Victorian Government for the planning and development of MRD6(d), if and when HRL is issued with a Mining Licence.

Figure 14 MRD6(d) — Plan View

10.4 COSTS AND TIMING OF THE RIVER DIVERSIONS

A comparison of the costs of the various Morwell River Diversions, and the amount of previously quarantined coal they make accessible, is shown in Table 12 below. The figures were submitted by IPRH (see Exhibit IPRH#39).

Table 12 Costs and benefits of various river diversions

Diversion	Replaced Diversion	Volume of quarantined coal "released"	Cost	Cost ratio
MRD4 (Yallourn)	MRD3	500 Mt	$110 million	4.5 tonnes/$
MRD5	MRD2	355 Mt	$70	5 tonnes/$
MRD6(c)	MRD5	340 Mt	$300	1.1 tonnes/$
MRD6(d)	MRD5	340 Mt	$98	3.5 tonnes/$

The need for MRD6(c) varies depending on the scenario considered.

If IPRH sought a further extension to the west beyond their present proposal, they would not require access to the coal before 2031. With the construction period for MRD6(c) being 8 years ("most likely" construction period estimated by RTL), and allowing a further two years for planning and approvals, and one year to vegetate the new diversion, IPRH would need to make a decision by 2020. IPRH have stated that the time for their decision would be 2018, which allows another two years for construction beyond the "most likely" construction schedule.

If the future operator of the Driffield Mine (HRL for example) wished to access the coal beneath MRD5, the timing of this access would depend entirely on the mining method established for the Driffield Mine. However if HRL wished to maintain the option of constructing MRD6(d), it would need to be factored into their mine planning well before mining commenced in 2012.

10.5 DISCUSSION

10.5.1 THE PANEL'S APPROACH TO THE INTERFACE ISSUE

In order to structure its considerations, the Panel has set out to address the following questions:

- Is it reasonable that IPRH should seek to construct the deviations of the Morwell River and the Strzelecki Highway in locations that impact on future potential miners?
- Did the parties (IPRH, HRL and DPI) keep each other adequately advised of their respective interests and intentions?
- Who should pay for future deviations of river (or highway)?
- How might MRD6(d) be progressed?

10.5.2 IS MRD5 REASONABLE?

There are a number of ways of addressing this question. One would be simply to consider the relevant legislation and planning controls, which allow infrastructure provision by one party, on land covered by an exploration licence held by a second party. Not only were examples of such actions within the Latrobe Valley cited, but DPI stated that "HRL's exploration licence only confers the right to explore for coal, nothing else." (Exhibit DPI #1).

DPI provided further advice to the Panel in response to Direction 2(a). Its response included the following advice:

> *"DPI has considered the impact of the diversions on HRL due to the road and river diversions, additional overburden and the likely need to again move the Morwell River. Nevertheless, the MRD Act does not confer to the holder of an exploration licence any pre-emptive right over any other current or future land-use on either freehold or Crown land. As noted above, the exploration licence only provides exclusivity in the exploration for minerals and nothing else.*
>
> *The panel should also be aware that exploration licences blanket much of Victoria, including many urban areas (see Figure 2). Where this occurs, the presence of an exploration licence has never before been used as the basis of influencing private or Crown development or infrastructure. It is understood that there is an economic opportunity cost where urban development has encroached on known mineralisation, for example, the goldfields of Bendigo and Ballarat."*

DPI advised that, on balance, they supported the IPRH proposal, and they made no suggestion that the location of the river and highway deviations were inappropriate, or that any compensation should be paid to HRL.

The Panel can sensibly conclude from the above that IPRH's proposals for MRD5 and the Strzelecki Highway are reasonable.

Considering past coal mining experience in the Latrobe Valley provides an alternative way in which the matter can be viewed. At the outset, the Morwell River was a geographical constraint. When it became economically viable to remove the constraint the current mining operator undertook the deviation of the river. The SECV did this on several occasions; constructing MRD1, MRD2 and MRD3 (see Table 10 in Section 9.1). Following the privatisation of the power industry in the Latrobe Valley, first Yallourn Energy and then IPRH have found it economically advantageous to address the constraints of MRD3 and MRD2 respectively by diverting the river yet again. In doing so, they have borne (or propose to bear) the full cost of the diversions.

It is clear that they bought the businesses in the full knowledge that the existing diversions prevented full recovery of the available resources. It is in this sense that the Panel has posed the next question.

10.5.3 WAS THE COMMUNICATION BETWEEN THE PARTIES ADEQUATE?

It is clear that in the long history of communication between IPRH and HRL, the full significance of the IPRH proposal was not understood by HRL until late in 2003. The Panel considers that the mind set in early 2002 of HRL is well demonstrated by the plan prepared for HRL during the brown coal tender (Figure 13 above). This figure not only shows Phase 1 of

the Driffield Mine extending to the boundary of the Exploration Licence, but shows a potential Phase 2 extending eastwards through the IPRH mining licence up to MRD2.

The Panel asked HRL if they had undertaken a Due Diligence search during the tender process, and was assured they had. In view of the lengthy public process for Yallourn Energy's MRD4, and the publicity attending IPRH's decision to explore options for the future, the Panel can only assume that HRL had simply not turned its mind to the implications to it of IPRH's future plans. Confirmation of this view was provided by the tacit admission by HRL that prior to mid 2003 they had not considered the actual mine development.

Concerning IPRH's communication, it seems to the Panel to have been fair. Should IPRH have said to HRL "Be aware that our proposed MRD5 will quarantine some of the coal within the Exploration Licence area." The Panel does not believe that such advice is to be expected. What appears to have been done is that IPRH has advised HRL of their plans progressively, and HRL has simply failed to recognise that IPRH's plans had an impact on the future winning of coal within the area of HRL's Exploration Licences.

Concerning the advice to DPI about their plans, again IPRH seems to have acted responsively throughout. They advised DPI of their early planning, and DPI used that information in the brown coal tender documents to define the limit of the proposed exploration licences it was offering. During the tender period IPRH advised DPI of changes resulting from its more detailed studies. DPI advised that due to probity reasons, it did not wish to change the tender documents.

In response to the Panel's query as to what information DPI had provided to tenderers concerning IPRH's plans, Guy Hamilton of DPI provided advice to the Panel in writing (DPI#4). That advice stated, in part:

> *"In March 2002 the Department received a request by IPRH to extend the company's proposed mining licence area for the West Field "…to include the area required from the road and river diversion ." This request was rejected.*
>
> *In July 2003 the Department announced the results of the Brown Coal Tender.*
>
> *In December 2000 the department noted in an email to Enesar that international Power Hazelwood (IPRH) would need to negotiate with HRL Development Pty Ltd (HRL) in regard to the road and river diversions for those areas of overlapping interest. Also in that month the Department met with HRL and there are diary notes showing IPRH had already been in discussion with HRL.*
>
> *On 6 March 2003 the Department granted Exploration License number 4685 (EL4685) to HRL. EL4685 covers 45 graticules (square kilometres) of private land and road reserves. EL4686 covers one graticule of Crown land, but with the nominally the same boundary as EL4685. The license for EL4686 has not been granted pending the resolution of Native title as required by the Mineral Resources Development Act 1990 (MRD Act).*
>
> *In summary, there is no clear evidence that tenders were provided with information relating to the plans of IPRH in regard to its plans for the diversion of the Morwell River, the Strzelecki Highway and Eel Hole and Wilderness Creeks either before or during the tender period. Nevertheless, both the Department and IPRH have been providing information to HRL for some considerable period and well before the grant of the exploration licence at which point significant financial commitments by HRL would begin. The Department has been assured on a number of occasions by IPRH that it was in discussions with HRL and that HRL was receiving all the documentation being tabled during the course of EES process (i.e. Draft consultants' reports). And finally, in*

September 2003 DSE and DPI briefed HRL in full of the developing situation in the West Field EES.

The Department is aware of the concerns held by HRL in regard to the IPRH diversion proposals. Nevertheless, despite information provided to it over considerable period of time, HRL has chosen to persist with the exploration licence."

The Panel notes that it is in the northern section of the IPRH/HRL boundary that the potential impacts on HRL are greatest. It is significant that IPRH have not changed their proposed location of MRD5 or the Strzelecki Highway deviation in the northern section since their advice to DPI on 1999.

The Panel has some sympathy with the position that each party, IPRH, HRL and DPI, finds itself in. It seems that there has been some miscommunication generally. The Panel is inclined to the view that the boundary problem has not been, to any great extent if at all, the fault of IPRH.

10.5.4 WHO SHOULD PAY FOR FUTURE DEVIATIONS OF THE RIVER?

The Panel was not entirely clear on the requirements for coal likely to arise from the HRL development. Should HRL succeed in moving from a pilot scale plant to an 800 MW plant, it would seem to require about 5 Mt of coal per annum, based on the evidence of Dr Terry Johnston. Over a 40 year life, this would amount to some 200 Mt.

While a theoretical 313 Mt would be available within the area of the HRL Exploration Licences even if MRD5 were constructed, and the southern area deemed uneconomic, this figure must be further reduced to allow for operational factors. Ted Waghorne suggested a further reduction of 40 Mt from the 313 Mt quoted above where the southern extension of the mine is considered uneconomic, leaving 263 Mt of winnable coal. This would equate to 53 years of supply for the proposed 800 MW power station.

On the other hand, HRL may well wish to preserve the maximum possible amount of coal in any future mining licence, so as to maximise their financial position and interests.

The Panel considered that the question of the impact and costs of moving infrastructure from the exploration tenements would be a matter for HRL to assess at the time they were applying for a mining licence. They would have to consider not only the river and highway diversions, but also existing high voltage electricity transmission lines across the tenements (In this respect, it should be noted that the concerns of HRL about new transmission lines were unfounded. IPRH's proposal for the re-routing of the HPS – ROTS 220 kV line to the south of West Field is on land owned by IPRH and outside the HRL tenements. To the west, it lies between the proposed West Field Phase 2 mine and MRD5).

The Panel considered that the future cost of moving MRD5 and the Strzelecki Highway deviation (presuming that they go ahead) should be borne by parties in proportion to the benefit accruing to the parties at that future time. Any mining licence that may be issued to either IPRH or HRL should articulate this proposition.

10.5.5 HOW MIGHT MRD6(D) BE PROGRESSED?

The Panel was impressed by the thoroughness with which IPRH investigated the HRL interface issue, and the creativity they displayed in generating option MRD6(d) under tight time-lines. Indeed, if IPRH was to be responsible for the entire mine development of West Field and Driffield, no doubt it would be delighted to have come up with a future replacement for MRD5 that saves in the order of $200 million over the cost of MRD6(c).

Clearly, however, the implementation of MRD6(d), if it ever happens, will only be possible through the desire of the operator of the Driffield Mine.

DPI has stated that it wishes to see the companies work together to ensure that coal is not quarantined at their boundary. It would follow that DPI should endeavour to provide incentives to encourage the parties to deliver the outcome DPI seeks.

Following the resolution of the present IPRH proposal, it would seem desirable for DPI to assist the parties to cooperate in their future planning so that the State's objectives are achieved.

At the reconvened hearings, both IPRH and HRL alluded to ongoing discussions between the two firms. While these discussions are presently commercially sensitive, and no details have been provided to the Panel, it seems clear that the two parties are working together to develop a common approach to the future mining of the resource. The Panel welcomed this sign of cooperation between the parties.

10.5.6 CONCLUSIONS ON THE HRL INTERFACE

The Panel concludes that it is entirely reasonable for IPRH to seek approval for the location of MRD5 and the relocation of the Strzelecki Highway in the manner set out in the EES. The mining legislation, the planning framework and past experience support the view that infrastructure can appropriately be sited on land covered by exploration licences held by third parties.

The Panel considers IPRH to have been quite fair in its communications with others, including DPI and HRL. Any failure in communication might be attributed in part to the past focus of HRL, which was understandably on developing their process rather than considering the practical aspects of mine development, and the desire of DPI not to open itself to any charge of a lack of probity in the tender process. Certainly DPI had the opportunity to clarify the boundary issue prior to finalising the Exploration Licences with HRL.

Having said that, the Exploration Licences awarded to HRL do not confer on HRL any right to access to the coal within the tenements unfettered by infrastructure. A key principle in deciding who should pay the future costs for relocating infrastructure, including the future replacement of MRD5 (presuming it is constructed by IPRH in the next few years), is that costs should be borne by the parties to whom benefit accrues at the time of relocation.

Following the resolution of the present IPRH proposal, it would seem desirable for DPI to assist the parties to coordinate their future planning, as may be necessary, and to the greatest extent possible, so that the State's objective for full coal recovery across the boundary is achieved.

10.5.7 RECOMMENDATION ON THE HRL INTERFACE

The Panel recommends that:

- **the consideration of IPRH's present proposals should not be adversely affected by concerns for the future interests of HRL, as there seems to be no basis for such consideration;**
- **a key principle for allocating future costs for relocating infrastructure, including MRD5 should it be constructed, is that the costs should be borne by the parties to whom benefits accrue at the time of relocation; and**
- **following the resolution of the present IPRH proposal, it would seem desirable for DPI to assist the parties to coordinate their future planning, as may be necessary, and to the greatest extent possible, so that the State's objective for full coal recovery across the boundary is achieved.**

11. THE PROPOSED FIFTH MORWELL RIVER DIVERSION

11.1 OVERVIEW OF THE FIFTH MORWELL RIVER DIVERSION

11.1.1 BACKGROUND

The westward extension of the Hazelwood Mine beyond 2009 is constrained by the Morwell River, the Strzelecki Highway and by a number of minor roads and private properties. Another matter to be considered is the Minerals Exploration Licence issued to HRL over the area generally to the west of the Hazelwood Mine.

IPRH proposes that the Hazelwood Mine extension project should evolve in two basic Phases. Phase 1 is already underway and involves the extraction of coal up to the current location of the Morwell River (MRD2), which would provide sufficient coal for the operation of the power station until 2009. Phase 2 relies upon the relocation of the river, streams and roads to maintain coal supply from the west field mine extension to 2031. In order to be in a position to commence Phase 2 in 2009 it is necessary to develop the design for the relocation of the river, streams and roads, obtain the necessary approvals for these relocations, finalise detailed design and complete the construction and rehabilitation of the works by that time. IPRH demonstrated that this requires project approvals by the end of 2004.

Figure 2 (see Section 3.2 above) shows the location of the proposed Fifth Morwell River Diversion (MRD5), diversions of the tributary Eel Hole and Wilderness Creeks and the relocation of the Strzelecki Highway. Several options for MRD5 and the longer term MRD6 were considered in Chapter 9 of this report where it was concluded that the general alignment of MRD5 proposed by IPRH was the most acceptable provided it met the necessary waterway operational and environmental criteria.

Following consultation with stakeholders, IPRH finalised its planning and design objectives (Section 1.5 of the EES), which include the following:

- *To divert the Morwell River around the mine in a manner that achieves a design that:*
  - *provides a geomorphologically robust landscape of natural appearance;*
  - *provides a river channel and floodplain populated sustainably by indigenous flora and fauna;*
  - *reflects the vision of the Victorian River Health Strategy;*
  - *satisfies IPRH's operational and financial requirements.*
- *To avoid and minimise impacts on the beneficial uses of surface water and ground water.*

The MRD5 proposes to relocate the river over a 7 km reach to the west of the current alignment between Driffield and approximately 1 km south of the Princes Freeway. The

diversion will replace the existing 4 km Second Morwell River Diversion, which comprises a 3 m diameter low flow underground concrete pipe and an open-channel floodway (which replaced the original Morwell River that flowed through the site now occupied by the current Hazelwood Mine).

IPRH propose to develop the deviation MDR5 as a facsimile of a natural river, with a meandering channel set within a confined floodway excavated to a depth of (typically) 12 m below the existing ground surface. The Eel Hole and Wilderness Creek tributaries enter the Morwell River within the reach of the proposed MRD5. The proposed Eel Hole Creek Diversion will move a section of the creek (previously diverted for the South West Field) over a length of approximately 2.6 km to enter the Morwell River near the upstream end of MRD5. An existing reach of Eel Hole Creek will remain. The original (natural) alignment of Eel Hole Creek is through the Hazelwood cooling pond and to the south west of the mine. The proposed Wilderness Creek Diversion would be 8 m above the level of the MRD5 at its new intersect. As a result, it is proposed to realign Wilderness Creek to enter the MRD5 1.8 km further upstream through a new wetland at the confluence. It is proposed that the MRD5 and the creek diversions will incorporate the features of a natural watercourse such as billabongs and flood-runners along MRD5 and a variety of in-stream habitats and native riparian vegetation along each of the other waterways.

IPRH suggest that MRD5 will be one of Australia's more ambitious environmental reconstruction projects with the aim of restoring the Morwell River to a realistic facsimile of a natural river where there is now a pipe and floodway.

11.1.2 STREAM DIVERSION PROJECT RATIONALE AND OBJECTIVES

The EES Assessment Guidelines issued by DSE include objectives to guide the evaluation of the various elements of the West Field Project (DSE EES Guidelines Section 4.5). The following evaluation objectives from the EES are relevant for the MRD5 and stream diversions:

- To maintain or establish adequate hydrology and channel capacity, and to enhance the aquatic health and biodiversity of the affected waterways to the extent practicable (dealt with in this chapter of the Panel Report).
- To avoid adverse impacts on public health and minimise any short-term risk to public safety and amenity during construction works and operations (dealt with in chapters 15 and 16 of this report).
- To avoid to the extent practicable adverse impacts on known sites of Aboriginal or post-settlement cultural heritage (dealt with in chapter 19).
- To minimise to the extent practicable and compensate for adverse ecological effects on native vegetation (communities or species) including the Strzelecki gum (dealt with in chapter 13).
- To reasonably avoid compromising future development of coal reserves in the adjoining areas with exploration licences and therefore enable orderly development of the coal reserves (dealt with in chapter 10).

While the first objective listed above is the key topic of this chapter, the issues raised in response to the other objectives were taken into account in the development and evaluation of the alignment and design concept for MRD5 and the diversions of Eel Hole and Wilderness Creeks.

Earlier diversions of the Morwell River include those east of the Yallourn mine (MRD1), west of the Hazelwood mine (MRD2), a further diversion east of the Yallourn Mine (MRD3) and a diversion across the Yallourn mine to enable extraction of coal from the Maryvale field (MRD4). This latter diversion (currently under construction) is located on an elevated overburden dump (combined with a coal dyke) to replace an earlier proposal around the mine.

Options for MRD5 are discussed in chapter 9 of this report. These included earlier options to the east (the SECV's long term option MRD6 into the Bennetts Creek catchment), to the west through and around the Driffield exploration area, options around the southern and eastern sides of the Hazelwood mine and options across the Hazelwood mine.

IPRH indicate that the current diversion (4 km length) of the Morwell River (MRD2) quarantines 240 Mt of coal that MRD5 will release. MRD5 is 7 km in length and will quarantine 412 Mt. However, with MRD5 in place, the Hazelwood mine extension will have the economic advantage of an extended resource of 495 Mt worked on from an advancing mine face. The coal quarantined should still be an economic proposition if and when the need to mine it arises in due course. (Note: the coal quantities quoted above are taken from Section 3.2.4 of the EES, Main Report, Volume 1. Different quantities were quoted later by IPRH, and have been presented in Chapter 10 in particular. These differences arise from consideration of the North-South extent of the coal under consideration, whether it includes all the coal or just what is considered practical to mine, and the offsets and safe slopes assumed for the calculations).

IPRH, in Section 3.3 of the EES, through a number of detailed studies (specifically supporting studies 6 and 7 appended to the EES) and through expert witnesses presented during the hearing process, have reasonably established that the resulting functional designs produced the most cost effective design for MRD5 and the stream diversions while meeting the stated objectives and design criteria.

11.2 STREAM DIVERSIONS –PROJECT DESCRIPTION

11.2.1 EXISTING CONDITIONS, OBJECTIVES AND DESIGN CRITERIA

The Morwell River rises in the Strzelecki Ranges and drains northwards into the Latrobe River that in turn drains into the Gippsland Lakes. The proposed diversion is in the lower part of the catchment at about 40 m (Australian Height Datum). It drains a catchment of approximately 600 sq km with an annual rainfall of approximately 1000 mm.

The section proposed for realignment includes the natural meandering river channel in its upper reach and the existing MRD2 consisting of a concrete piped drain beneath a grassed open channel floodway (see Figure 2). At the north end, MRD5 is proposed to enter enlarged wetlands south of the Princes Freeway southwest of Morwell.

To meet the objectives set out in 11.1.1, the river diversion design must:

- support a diverse array of indigenous plants and animals;
- be flanked by a mostly continuous broad band of native riparian vegetation;
- allow flows that rise and fall with the seasons, inundating floodplains, filling billabongs and provide a flush of growth and the return of essential nutrients to the river;
- avoid degradation of and if possible, enhance, water quality;

- allow native fish and other species to move freely along the length of the river and into the floodplains and billabongs;
- contribute to the health of the broader Morwell and Latrobe River systems;
- protect the current and future consumptive uses of the waters of the Morwell and Latrobe Rivers;
- provide pleasurable environments for those enjoying a range of river related leisure pursuits;
- preserve the values that are fundamental to indigenous cultures, and;
- maintain the River's place in human collective history.

The ***stream design criteria*** are summarised as follows:

- an afflux of 100 mm for a 20-year ARI (100-year annual return interval) flood event to avoid nuisance flooding to upstream property owners, an afflux of 300mm at the upstream end for a 100-year ARI to avoid flood damage and no afflux at Yinnar from 1,000-year ARI's as a result of the river diversion;
- protection of the Hazelwood Mine from a 10,000-year ARI flood event;
- channel velocities less than 1.5m/sec for a 2-year ARI and less than 2.5m/sec for a 50-year ARI and flood plain velocities of less than 1.5 m/sec for a 50-year ARI to contain stream power and shear stress to minimise erosion damage and erosive adjustment of the channel alignment;
- stream condition will be superior to the existing condition upstream of the Yinnar-Driffield Road and the physical form of a similar nature, with the morphology of a natural appearance comprising a meandering river channel with pools and runs allowing for the passage of fish;
- the discharge capacity of the river channel will be equivalent to that of the existing river allowing overbank flows for events larger than 1.5 to 1.6-year ARI events to allow nutrient cycling and sediment deposition and, ultimately, the recruitment of large woody debris from floodplain vegetation;
- revegetation will enhance the ecological value by the use of indigenous species;
- water quality will comply with the objectives specified by the SEPP for Waters of Victoria in as much as there will be no deterioration in water quality in the long term as a result of the diversions (IPRH have no control over upstream water quality).

11.2.2 STREAM DESIGN PROCESS

The design approach for MRD5 was to satisfy three operating regimes for the river:

- all flows up to the 1.5 to 2-year ARI events are to be contained within the low-flow river channel – these flows dominate (i.e. 98% of the flows) and produce the overall ecological function of the river;
- flood events up to a 20-year ARI would overtop the banks and flow across the floodplain inundating billabongs and flood-runners – these flows are very important in their role of carbon recycling and as a reproductive trigger for flora and fauna species;
- floods greater than a 20 ARI event are to be managed as per 11.2.1 above (300mm afflux for the 100-year ARI and protection of the Hazelwood Mine from a 10,000 ARI event).

Eel Hole and Wilderness Creeks are to operate in a similar manner but with appropriate channel and floodway forms to contain lower flow regimes.

Topographic surveys were carried out to provide longitudinal and cross section information for hydraulic modelling and hydrological assessment and a detailed evaluation of a range of options. Five alignment options, together with different combinations of gradient and channel base width resulting in 18 different arrangements were evaluated.

The adopted alignment was the most cost-effective design that satisfied the hydraulic design criteria, minimised earthworks, and reduced contact with the underlying coal seam. The adopted alignment is approximately 7 km log with a high-flow channel generally 80 m in width. Levees are required to protect the Hazelwood mine from a 10,000year ARI event. Levees are generally less than 4m in height but with a 9m levee at the upstream (southern) end to divert the river into the channel and a 7 m backwater levee at the downstream end.

The proposed river form (meandering low flow channel within the high flow channel) and cross section are shown in Figure 15. This river form matches the river form upstream and downstream of the section to be deviated and is a major improvement on the existing MRD2 (with the low flow pipe under the grassed open channel).

A geotechnical investigation found that the alignment was generally located in stable soil conditions requiring 3:1 batter slopes (with flatter slopes required in some short sections) to avoid erosion. The geotechnical work also demonstrated that the Morwell 1 coal seam would be intersected over about 50% of the length of the diversion. To minimise seepage into the coal, the river channel will be over-excavated and backfilled with clayey soils and silty clays. The use of deeper pools, slow flowing sections and wetlands would reduce turbidity, nutrients and erosion. This would result in an improved environment for fish and macroinvertebrates. The revegetation design aims to emulate, where possible, the species and diversity of plant communities that existed prior to European settlement.

The ***Eel Hole Creek*** diversion would commence about 1 km downstream of the Hazelwood cooling pond outlet and traverse 2.6 km to join the MDR5 at its downstream end (see Figure 2 for its location). The diversion is designed as a chain-of-ponds system on a very flat gradient to reflect the low energy environment created by attenuation of flows through the Hazelwood cooling pond. The high-flow channel will be at least 8 m wide to provide for a band of riparian vegetation. The width will be increased to enable 12 to 15 pools of up to 2 m depth to be constructed to ensure water will be retained during extended periods of low flows. At the downstream end of the diversion, a levee will be constructed to divert the stream away from its current course and to protect the mine extension from floodwaters backing up the diversion from the Morwell River. A clay liner will be put in place on the batters and the base of the creek to reduce scour and encourage macroinvertebrates and revegetation along the diversion.

The proposed MRD5 would cross ***Wilderness Creek*** about 1.6 km upstream of the creek's current confluence with the Morwell River (see Figure 2). Discharging the creek into the MRD5 at this point would require a significantly increased streambed gradient. In order to maintain a reasonable stream gradient, the Wilderness Creek diversion has been designed to run south to intersect with the bed of the Morwell River in the vicinity of the MRD5 inlet. An incised stream with a 12 m wide floodplain is proposed with a 1 m deep creek channel with a width of 6 m within the floodplain. Rock chutes are required at the up and downstream ends of the diversion to achieve the desired overall streambed gradient. The rock chutes will be

designed to allow the passage of fish. A wetland will be established at the confluence of the Wilderness Creek diversion and the upper end of the MRD5 to contain any deposition of silt from Wilderness Creek and would limit the remobilisation of sediments and nutrients by the low energy flows in MRD5.

Figure 15 Fifth Morwell River design arrangement

Ground movement studies carried out for the proponent (of possible subsidence in the Driffield area over the life of the Hazelwood Mine project to 2030) indicated the likelihood of a differential tilt to the north of approximately 350 mm along MRD5, an inclination to the east of up to 300 mm along the Eel Hole Creek diversion and negligible subsidence along the Wilderness Creek diversion. All of these movements would be well within the design tolerance of each diversion and would not cause any adverse flow conditions. However, anticipated potential horizontal strains to the northwest of the mine extension may exceed tolerance levels for the Morwell River backwater levee and stream channel levees in that area. This requires the ongoing monitoring of ground movement and management methods described in chapters 14 (Ground Water Extraction and Water Use) and 20 (Environmental Management) of this report.

11.2.3 CONSTRUCTION PROCESS

Conventional construction methods are proposed to be used for the river and stream diversions and the relocation of the Strzelecki Highway utilising heavy earthmoving and road construction plant and equipment. Construction will advance upstream from the respective river or stream outlets ensuring the works are free draining with minimum risk of batter failures during construction. Interception drains will be located on the uphill side of all earthworks to avoid rilling down batter slopes and catch drains will be placed along the length of the stream diversions to collect surface runoff from disturbed areas. Small sedimentation ponds will be established along the length of the MRD5 as earthworks proceed. Two linked main sedimentation ponds will be located at the downstream end of the MRD5 to receive surface runoff prior to discharge into the Morwell River. These will extend the existing wetland south of the Princes Freeway.

Removed topsoil will be stockpiled for later use (rehabilitation etc) and other excavated material (including overburden and low-grade coal) will be deposited in nearby spoil mounds between the diversions and the future extensions of the Hazelwood mine (see Figure 2 for locations). A detailed construction sequence and adequate temporary traffic management measures have been proposed and are explained in the EES (Section 7.8.2) and in Supporting Study 1. The proponent has based the timing of the construction sequence on the assumption that the necessary approvals will be in place by the end of 2004 to allow completion in 2009 so that the extension of the Hazelwood Mine (under either the current or an extended licence) can commence that year. Five construction seasons are proposed (generally November through to May) as follows:

- Construction season 1 (early 2005) includes extension of the wetlands, highway diversion earthworks, commencement of road over waterway bridges and a start on MRD5 and creek diversion earthworks;
- Season 2 (from late Spring 2005 to late autumn) includes the completion of the highway deviation, substantial progress with the earthworks for MRD5 and Wilderness Creek;
- Season 3 (from late Spring 2006to late autumn) includes the completion of earthworks for MRD5, the rehabilitation of the first (northern) half of MRD5, completion of the Wilderness Creek diversion and the diversion of the low flow from the Morwell River to MRD5;
- Season 4 (from late Spring 2007 to late autumn) includes the completion of the rehabilitation of MRD5 and the construction and rehabilitation of Eel Hole Creek;

- Season 5 includes the diversions of the full flows of the Morwell River and Eel Hole Creek to the diversions, the completion of diversion levees and the decommissioning of MRD2.

Details of the river and stream evaluation and design processes and results can be found in Supporting Study 6: Stream Diversion Functional Design Report and Supporting Study 7: Hydrology, Water Quality, Waterway Restoration and Aquatic Ecology Study and in the witness statements made in support of these studies. The functional design was developed in consultation with key stakeholders, in particular, the West Gippsland Catchment Management Authority. At the request of the authority, a ***peer review process*** was implemented using R J Keller and Associates to review the stream design and R G Mein and Associates to review the hydrologic assessment. Dr Keller appeared as an expert witnesses at the hearing and indicated that the peer reviewers were most satisfied with the designs.

The overall *Planning Environmental Management Plan* (**PEMP**) is discussed in Chapter 21 of this report. Part 7 of the PEMP (the Construction Environmental Management Plan) sets out the responsibilities for design, construction, and monitoring for the MRD5 and the Eel Hole and Wilderness Creeks. The required environmental outcomes of these works are generally as already described in this chapter of the Panel's Report. Specific environmental criteria such as construction dust monitoring and control, the minimisation of greenhouse gas emissions, the management of construction noise, the use of excavated soils, the management and monitoring of surface water runoff, traffic management during construction, the rehabilitation of the river and stream diversions with the planting of relevant indigenous species, measures to encourage repopulation by aquatic fauna and the rehabilitation of spoil mounds are all detailed and the necessary commitments to meet these criteria are all given.

Clear and acceptable arrangements with the *West Gippsland Catchment Management Authority* (**WGCMA**) are required to monitor the detailed design and construction phases of the river and stream diversion works. Also, the authority must be satisfied that the final product (the completed diversion projects) meet their performance criteria before handover is effected. It is intended that the peer review process used during the preparation of the EES be continued during detailed design. It is suggested that a peer review process be continued during construction, and periodically during the implementation phase, to ensure the performance criteria have been met before hand-over of the works. An agreement between the West Gippsland Catchment Management Authority and the Proponent to meet these goals will therefore be required. This agreement should be referenced as a condition in the Work Plan and the relevant Planning Scheme Permit.

The Panel also raised the question of whether the diversion of Wilderness Creek could have some sinuosity introduced. The proponent advised that an extensive set of options had been investigated to achieve agreed trade-offs between channel stability, fish passage requirements, excavation volumes, constructability and aesthetics. Further calculations were done in response to the query. To introduce sinuosity would require a significant widening of the cross-section for the deviation. This would cost of the order of $1 million.

11.2.4 CONCLUSIONS ON THE STREAM DIVERSIONS

With respect to the proposed Fifth Morwell River Diversion and the diversions of the Eel Hole and Wilderness Creeks, the Panel concludes that the location, design and construction processes are satisfactory. From an environmental point of view, the Panel is of the opinion that the proposal for the MRD5 is far superior to the currently operational MRD2 (which relies upon an underground drain for low level flows with minimal treatment of the flood way channel) and allowing for the fact that it will be 'man-made', it will be a reasonable facsimile of a natural water course. The same comment applies to the Wilderness Creek diversion that replaces a degraded section of this stream. The design retains part of Eel Hole Creek that has a high environmental value and complements this with a high quality diversion.

In order to proceed, a satisfactory agreement is required between the West Gippsland Catchment Management Authority and IPRH to monitor the design and construction and to define the criteria for the hand-over of the diversions once construction and rehabilitation are complete. The Panel is of the view that an ongoing peer review process and the relevant sections of the Construction Environmental Management Plan should form the basis of this agreement and that the agreement should be included as a condition in the Work Plan and the relevant Planning Permit.

11.2.5 RECOMMENDATIONS ON THE STREAM DIVERSIONS

The Panel recommends that, subject to meeting the statutory requirements spelt out in Chapter 22 of this report:

- **the design and construction process for the MRD5 and the diversions of Eel Hole and Wilderness Creeks be accepted, and;**
- **the West Gippsland Catchment Management Authority and IPRH enter an agreement that sets the criteria for handing over the completed diversions based on a process that utilises the relevant sections of the Construction Environmental Management Plan and the already established peer review process. This agreement should be included as a condition in the Work Plan and the relevant Planning Permit.**

12. TRAFFIC AND TRANSPORT

12.1 OVERVIEW OF TRAFFIC AND TRANSPORT ISSUES

Figure 2 (see Section 3.2 above) shows the existing road network and changes proposed as a result of the westerly extension of the Hazelwood mine. The main road related issues to be addressed are the need to:

- deviate the Strzelecki Highway between its intersection with the Yinnar-Driffield and the Morwell-Thorpdale Roads and the interchange with the Princes Freeway on the western approach to Morwell;
- close Brodribb Road between the Yinnar Road and the existing Strzelecki Highway together with other local access roads to the south of the mine, with the consequent rerouting of traffic (especially that between the Princes Freeway and both Churchill and the Hazelwood Power Station that currently travels west and south of the Hazelwood Mine);
- relocate the over-dimensional route OD9, which currently bypasses the freeway section south of Morwell via Marretts Road, Brodribb Road, Tramway Road, Firmins Lane and Hyland Highway to return to the Princes Highway east of Traralgon (OD9 services the Hazelwood and Loy Yang Power Stations and Gippsland beyond Traralgon).

The deviation of the Strzelecki Highway and the relocation of OD9 need to meet the design and road safety standards of VicRoads and the closure of local roads and the redirection of local traffic need to meet the requirements of the Latrobe City Council. The proponent makes a case for the timing of the completion of the highway deviation and changes to the local road network to coincide with the completion of the Fifth Morwell River Diversion (discussed in section 11.2.3 of this report) to allow the westerly extension of the Hazelwood mine to commence in 2009. The suggested timetable includes completion of the Strzelecki Highway deviation in April 2006.

The proposed Strzelecki Highway deviation will be 7.8 km long with an 11 m wide sealed surface (2 x 3.5 m lanes plus 2 m sealed shoulders) within a 100 m wide right of way and a design speed of 100 kph. The roadway is designed to be generally elevated on fill with earthen sound attenuation mounds at critical noise sensitive locations. The fill material will be provided from the excavations to accommodate MRD5. Two bridges are required to elevate the highway over Wilderness Creek (minor bridge) and the Morwell River at the northern extremity of the MRD5 (90 m long bridge). Stock access will be provided under the Wilderness Creek bridge.

The EES Assessment Guidelines (DSE) provide the following evaluation objectives that are relevant to the road system:

- to maintain efficient and effective road linkages in the context of proposed changes to the road network;
- to avoid adverse impacts on public health and minimise any short term risk to public safety and amenity during the construction works and operations;

- to avoid to the extent practicable adverse impacts on known sites of Aboriginal or post settlement cultural heritage;
- to minimise to the extent practicable and compensate for adverse ecological effects on native vegetation (communities or species) including Strzelecki gum;
- to reasonably avoid compromising future development of coal reserves in the adjoining areas with exploration licences and therefore enable orderly future development of the coal reserve.

While the first objective is the key topic of this chapter, the other objectives were taken into account in the development and evaluation of alignment options for the Strzelecki Highway deviation in conjunction with the fifth diversion of the Morwell River (refer to Chapters 9, 11, 15 and 16 of this report).

Specific objectives for the highway deviation were:

- the design must meet VicRoads road design and road safety standards;
- the design must be integrated with the functional design for MRD5;
- the design must accommodate the requirements of third-party owned assets and services to be relocated along or across the road diversion;
- where possible, the design must use suitable fill from excavation works for MRD5 to minimise cut and fill requirements and mass haul distances;
- water run-off during construction is to be captured by interception drains along the top of batter slopes and by catch drains to collect all surface run-off from disturbed areas, all of which is to be directed through sedimentation ponds including two major ponds at the downstream end of MRD5 to link with the pre-existing wetlands immediately upstream of the crossing of the Princes Freeway.

The following road design criteria were specified:

- VicRoads Type B Road standard conforming to the current classification of the Strzelecki Highway;
- V100 (100km/h) standard in accordance with VicRoads Design Guidelines (with minimum 700m curve radius);
- intersections in accordance with Austroads Guide to Traffic Engineering Practice;
- bridge design for over-dimensional routes in accordance with Austroads Bridge Design Code including relevant standards for vertical clearances on over-dimensional routes;
- property access points in accordance with typical rural driveway specifications;
- road Safety Audits in accordance with VicRoads Policy and Austroads standards;
- pavement design life of 25 years *(Note: initially proposed as 20 years in the EES but amended to 25 years in the VicRoads submission 336);*
- ideally, pavements are to be above flood level resulting from a 100-year ARI event
- cross drainage designed for 10-year ARI flood events;
- minimum 1% longitudinal grade on superelevation transitions to reduce the risk of aquaplaning.

12.2 ROAD CLOSURES AND DEVIATION IMPACT ASSESSMENT

The progression of the westward extension of the Hazelwood mine requires the replacement of part of the Strzelecki Highway and Brodribb Road and the closure of roads to the east of the proposed highway deviation – Amiets, Applegates, and Deans Roads and the partial closure of Golden Gully and Marretts Roads.

The proponent commissioned a series of studies (see Supporting Studies 1 to 5) to assess the traffic implications of a range of road network options, the physical feasibility of the proposed realignment of the Strzelecki Highway and options to replace OD9. These investigations were carried out in close consultation with VicRoads and the Latrobe City Council and involved discussion with the Technical Reference Group. A simple origin/destination study was carried out using number plate recording and a sample of car drivers were asked about travel patterns and potential impacts of road closures.

The final assessment of options is summarised in Table 3.4 of the EES. This table assessed three basic options for alternative Strzelecki Highway routes, three options for replacing Brodribb Road and three road network options. The options were assessed against the following criterion;

- traffic and road network development costs and operation;
- environmental impacts (flora and fauna, cultural heritage and hydrology);
- amenity (noise and visual impacts);
- social (community and road user views);
- economic (road user and business views);
- planning (compliance with Latrobe Planning Scheme).

This assessment demonstrated that Strzelecki Highway option 1, between the intersection of the Yinnar-Driffield and Morwell-Thorpdale Road and the Princes Freeway interchange immediately west of Morwell together with an upgrade of the Yinnar-Driffield Road from the Yinnar Road (from the south) was clearly superior for all criteria.

(NOTE: While EES Table 3.4 was found to be a useful summary of the assessment of options, the Panel was of the view that the step of adding the scores allocated to the options for each criteria was unnecessary. While the Panel accepts the scores allocated against each criterion are a useful aid in the assessment, it warns against the addition of the scores as such a mechanism could mask major flaws in any option. This method assumes an equal weighting for each criteria, which is not usually the case – the results could therefore be flawed. In this particular case, the selected option(s) was superior against each criterion, which made the addition of the scores an unnecessary embellishment.)

Environmental issues relating to the above criteria are discussed in later chapters of this Panel Report – flora and fauna in Chapter 13, air quality in Chapter 15, construction and traffic noise in Chapter 16 and other social issues in Chapter 19.

Brodribb Road currently carries about 1,000 vpd. Origin-destination surveys carried out for the proponent demonstrate the routes used by travellers on Brodribb Road (see section 11.5.2 of the EES). At the northern end of Brodribb Road, about 450 of the users travel to or from the west via Marretts Road and the Hernes Oak interchange on the Princes Freeway and about 500 travel to or from Morwell (through the west Morwell interchange with the Princes Freeway). At the southern end, about 620 travel to or from the south along the Yinnar Road

and about 270 travel to/from the Hazelwood Power Station and the Churchill area. The others have local origins and destinations. Most traffic (i.e. to or from the south) would not be disadvantaged, as the deviated Strzelecki Highway would serve their purpose. Those to or from Churchill and Hazelwood via the current Brodribb Road would need to find an alternative route to Morwell and the west – most likely via Monash Way and the Princes Freeway interchange east of Morwell or to or from the south via Yinnar Road. This would add 3 - 5 minutes to their journey time. Other local roads to be closed or truncated service properties to be acquired for the extension of the mine and would therefore not disadvantage any remaining landowners.

The resulting alignment of the Strzelecki Highway deviation is located immediately west of the MRD5 over most of its length. This arrangement minimises the land take for the highway and river deviations, it minimises the potential impact on the coal resource (see Chapter 8 of this report), it is economical in that the fill required for the highway road works and noise mounds can be sourced from the adjacent river diversion works, and while there will be some glimpses of the expanding Hazelwood Mine from the highway, views will generally be shielded by the placement of spoil mounds between the river diversion and the mine.

The Panel is of the view that further consideration needs to be given to the detail of the vertical alignment of the highway deviation. While the alignment meets the VicRoads design and safety standards, a minor lowering of the grade-line should be considered between chainages 1400 - 1900 of up to 3 metres and 5000 - 6100 of up to 4 metres during the detailed design phase. The suggested minor lowering of the road would lower and flatten two crests, reduce earthworks and reduce the visual intrusion of the road.

While not raised in any submissions, the Panel is of the view that there will be considerable interest in the mine, the river diversion and the wetlands (at the northern end of the MRD) to passing touring traffic. In order to provide opportunities for tourists (and locals) to pull off the through carriageway of the highway to view these features in safety, it is suggested that, as a minimum, simple lay-bys be provided. At these locations, the width of the sealed shoulder could be increased from the proposed 2 m to (say) 6 m over a length of 100 m or so to provide two or three stopping bays and a minimal length for deceleration into and acceleration out of the stopping bays. A cursory review of the engineering plans indicates that a location immediately south of the intersection of Golden Gully Road (at chainage 3450) may be appropriate for viewing the river diversion and, in the long term, the mine (as it advances west). At this location, the natural surface slopes down to the top of the river diversion batter, and a short (50 m) path would bring viewers to the edge of the river diversion floodway. A lay-by at chainage 8700 would provide easy access to a view over the existing wetlands and to a track that could be developed for access into the wetlands. These sites are suggestions and these and others should be subject to a site selection, design, appraisal and a safety audit process in consultation with VicRoads and the City of Latrobe before any decisions are made.

12.3 OVER DIMENSIONAL ROUTE 9

Figure 16 shows the current Over Dimensional Route 9 (**OD9**) from Melbourne leaving the Princes Freeway at the Hernes Oak interchange then along Marretts Road, Brodribb Road, Yinnar Road, Monash Way, Bonds Lane, Tramway Road, Firmins Lane and Hyland Highway to the Princes Highway east of Traralgon. This route bypasses overhead obstructions on the Morwell bypass section of the Prices Freeway where the bridges carrying the EBAC railway and Monash Way over the freeway limit headroom. The route provides direct access to and

between the Yallourn Power Station (via the Hernes Oak interchange), the Hazelwood and Loy Yang Power Stations and to other brown coal related installations and workshops along Monash Way and Tramway Road.

Figure 16 OD9 route options

While the Princes Freeway is capable of carrying large oversize and overweight loads between the Latrobe Valley (and Gippsland) and Melbourne and the port, these movements are restricted to the westbound (southern) carriageway of the freeway for movements in both directions, as only the bridges on this carriageway have been strengthened for over-dimensional (OD) vehicles. Within the Latrobe Valley, there is also the need to transport larger size (higher) loads over short distances (eg between workshops and power stations). Height restrictions on the freeway at the eastern Morwell interchange and weight restrictions on some of the waterway bridges in this vicinity make it necessary to either remedy these short-falls or to use a similar route to that currently in use.

A series of investigations (Supporting Studies 1 to 5) developed and reviewed a series of options and concluded that the either a route along the freeway (Option F on Figure 16) or a route utilising the new Strzelecki Highway deviation and part of the existing route passing the Hazelwood Power Station (Option E on Figure 16) would be the most feasible. Option F (along the Freeway) could not pass over-height loads and would therefore require either the removal of the disused EBAC railway bridge or earthworks and other modifications to build an at-grade crossing of the railway in the freeway median together with other modifications at the Morwell east freeway interchange.

These options were discussed at the Panel hearing with the VicRoads operational staff responsible for supervising the movement of over-dimensional loads to, through and within the Latrobe Valley. The operational staff were strongly of the view that:

- while it was not desirable to move east-bound OD loads on the west bound carriageway from Melbourne to the Latrobe Valley, this could be managed during low volume night-time periods with appropriate safety measures;
- the complicated movements required to utilise the freeway bypass of Morwell (Option F) for through and local OD loads was difficult to manage safely, especially with the need to move occasional over-height loads within the Latrobe Valley area;
- the use of the option E along the deviated Strzelecki Highway, Yinnar Road and on to the current route of OD9 would be easier and safer to manage, as local traffic can be more readily controlled than high-speed freeway traffic. Although this option was longer for OD movements through the Latrobe Valley, it provided convenient access between local origins and destinations, particularly for the (relatively) short distance over-height loads.

With respect to Option E, there are two issues not resolved in the EES. The first is the use of the Yinnar-Driffield Road between the southern end of the Strzelecki Highway deviation and Yinnar may require the removal and replacement of a significant number of Strzelecki Gums. Additional fieldwork carried out at the request of the Panel indicates the removal of trees can be avoided.

The other issue is the location of OD9 in the vicinity of the Hazelwood Cemetery. At this location, Brodribb Road would be truncated leaving the existing 'T' intersection with Yinnar Road as an undesirable 90-degree bend with a steep hill back towards the Hazelwood Power station entry. Alternative alignments between the Cemetery and the Hazelwood Cooling Pond were investigated. Figure 17 shows alignment option 3 close to the cemetery to the top of the steep hill from the east and option 4 at the lower level behind the pond foreshore (and below the hill). Although option 3 would have the shorter length of new road and would provide a panoramic view of the cooling pond, option 4 provides a flatter and more manageable gradient for OD loads and a safer alignment for all users.

For the reasons cited above by the VicRoads operatives in preference for Option E, and because of the safety considerations of the options in the vicinity of the Hazelwood Cemetery, the Panel accepts Option E as modified by option 4 at the cemetery as the preferred route for OD9. The adoption of option 4 will require changes to the Latrobe Planning Scheme, which are discussed in Section 22.4.5 of this report.

Figure 17 OD Review near Cemetery

12.4 TRAFFIC AND TRANSPORT CONCLUSIONS

With respect to the alignment and configuration of the Strzelecki Highway deviation, the Panel generally accepts the design proposed by the proponent with the following provisos:

- **The vertical alignment between chainages 1400 - 1900 and 4900 - 6100 should be reviewed to consider a lowering of the alignment by up to 3 m and 4 m respectively to reduce earthworks and visual intrusion.**

- **Consideration should be given to the opportunity to view the river diversion and the open cut mine extension by providing a lay-by beside the Strzelecki Highway deviation immediately south of the intersection with Golden Gully Road. A further lay-by at chainage 8700 would provide easy access to a view over the wetlands, and should also be considered.**

The Panel also wishes to warn against the addition of ratings used to rank options against particular criteria as used in Table 3.4 of the EES. Such an addition implies no differentiation of importance between criteria, which may not be the case, and could lead to a misinterpretation of the results of an assessment.

With respect to the selection of a replacement for the existing Over Dimensional Route 9, the Panel concludes that a route following Marretts Road, the Strzelecki Highway deviation and Yinnar Road to Hazelwood and then via the existing route should be adopted subject to the adoption of changes to the Latrobe Planning Scheme to accommodate alignment option 4 (the lower route behind the cooling pond foreshore) in the vicinity of the Hazelwood Cemetery.

12.4.1 TRAFFIC AND TRANSPORT RECOMMENDATIONS

The Panel recommends that:

- **the design of the Strzelecki Highway deviation proposed by the proponent be accepted subject to:**
  - **the review of the vertical alignment between chainages 1400 - 1900 and 4900 - 6100 to reduce earthworks and the visual impact of the road, and;**
  - **consideration of providing safe lay-bys at the edge of the Strzelecki Highway deviation to view the river deviation and the mine extension at an appropriate location, e.g. immediately south of the intersection with Golden Gully Road, and to provide easy access to a view over the wetlands at chainage 8700;**
- **Over Dimensional Route 9 along Marretts Road, Strzelecki Highway Deviation, Yinnar-Driffield Road and Yinnar Road to Hazelwood and then along the existing route be adopted subject to the resolution of a future amendment to the Latrobe Planning Scheme to accommodate alignment option 4 behind the foreshore of the Hazelwood cooling pond.**

13. FLORA AND FAUNA

13.1 SPECIES FOUND AND SIGNIFICANCE

13.1.1 STUDY METHOD

Biosis Research was engaged by IPRH to undertake the Flora and Vertebrate Fauna Assessment Studies. The spatial terms used include **Region** — the Gippsland Bioregion extending from Westernport to Lakes Entrance; **Study area** — an area bounded by the Princes Freeway and extending seven kilometres to the south, and bounded by the Hazelwood Mine and extending six kilometres to the west, shown in Figure 18 below; and the **Local area**, which covers an additional five kilometres from the study area.

Biosis extended existing knowledge about the flora in the Study area through botanical surveys for four days in mid-spring 1999 and four days in early-summer 2002, significant species searches for four days in June 2002, and for fauna through field survey over four days in December 2002 using a range of techniques including spotlighting, small mammal and bat trapping, nocturnal playback calls (owl and frog), bat call detection and active searching.

Mapping of the distribution of Strzelecki Gums was done in June 2003, and vegetation condition assessments were undertaken in September 2003.

13.1.2 CONSERVATION SIGNIFICANCE AND EVC'S

The following abbreviations are used to describe the status of a species:

- k indicates a species is poorly known in Victoria;
- R/r indicates a species is rare in Australia/Victoria;
- V/v indicates a species is vulnerable in Australia/Victoria.

Conservation significance is evaluated on a geographical scale with four levels: **national, state, regional** and **local**.

The **significance** of the taxon (species, subspecies or variety of a species) or community is the largest geographical context in which it is at least rare. For example, if a species is uncommon in a state and rare within a region within that state, it has regional significance within that region.

Species of **National Significance** are those meeting any one of the following criteria:

- flora or fauna listed as extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent under the *Environment Protection and Biodiversity Conservation Act 1999*;
- flora listed as rare in Australia in *Rare or Threatened Species* (Briggs & Leigh 1996);

- fauna listed as extinct, critically endangered, endangered, vulnerable or rare in Australia in an Action Plan published by Environment Australia.

Species of **State Significance** are those meeting any of the following criteria:

- flora or fauna listed as threatened under the *Flora and Fauna Guarantee Act 1988* or with final recommendation for listing by the Scientific Advisory Committee;
- flora listed as extinct, endangered, vulnerable or rare in Victoria in *Rare or Threatened Vascular Plants in Victoria – 2000* (NRE 2000);
- flora listed as poorly known in Australia in *Rare or Threatened Plants* (Briggs & Leigh 1996);
- fauna listed as critically endangered, endangered or vulnerable in *Advisory List of Threatened Vertebrate Fauna in Victoria, 2003* (DSE 2003);
- fauna listed as lower risk (near threatened or conservation dependent) or poorly known in Australia in an Action Plan published by Environment Australia.

The Supporting Study 8, Flora and Vertebrate Fauna Assessment Study, Appendix 2 provides further details of the significance of communities at National, State, Regional and Local level, and of species at the Regional and Local level. It also defines **No Significance** as follows:

> *"Species and ecological communities are not significant when they are considered not to be rare or threatened at any geographic level by Biosis Research using IUCN criteria where applicable (IUCN 2000). Species that are not indigenous to a given study site are not significant. Plantings are generally not significant."*

Ecological Vegetation Classes (**EVC**) are the basic mapping unit for ecosystem assessment, biodiversity planning and conservation management at the regional scale. Original mapping at 1:25,000 scale has been augmented by the field studies conducted by Biosis Research to define the distribution of in the study area. Table 13 lists them, and gives their bioregional conservation status.

Table 13 Ecological Vegetation Classes in the study area

EVC Number and Name	Gippsland Plain Bioregion Status	Within Project Footprint
16-15 Latrobe Valley Lowland Forest	Rare	No
16-03 Strzelecki Lowland Forest	Rare	No
23-04 Strzelecki Herb-rich Foothill Forest	Rare	No
23-05 Tussocky Herb-rich Foothill Forest	Rare	No
29 Damp Forest	Endangered	No
53 Damp Scrub	Endangered	Yes
74 Wetland Formation	Endangered	Yes
17 Riparian Scrub Complex	Vulnerable	Yes
126 Swampy Riparian Complex	Endangered	No

Habitat assessment is undertaken on two bases. The first assesses its resource value to support a community of fauna species, and includes habitat status, size and connectivity, condition, presence of significant species and other features. An area may be assessed as either High, Moderate or Low habitat value.

The second basis for assessing habitat value is under Victoria's Net Gain policy, which provides for the detailed measurement of "habitat hectares" (see below).

Figure 18 shows the EVC's within the study area, as reported in the DSE Database.

Figure 18 EVC's within the study area

It should be noted that the later field survey by Biosis Research found that the area denoted Swamp Gum just west of Marretts Road is in fact Swamp Scrub, a re-classification supported by DSE.

13.1.3 SURVEY RESULTS

FLORA

In Supporting Study 8 Biosis Research characterised vegetation in the study area as follows:

> *"The study area (and the surrounding landscape) has largely been cleared for agriculture and only scattered isolates of the original vegetation cover remain."*

Biosis Research recorded four species of national conservation significance during botanical surveys for the project. The DSE Flora Information System identified one additional species of national significance with potential habitat in the study area, and the EPBC database identified an additional three species of national conservation significance with potential habitat in the study area, though none of these were found by Biosis Research during their surveys. It might be noted that the Yarra Gum, while nationally significant, is not listed in the EPBC Database. Table 14 lists these flora species of national significance.

Table 14 Species of national conservation significance recorded in the study area or the local area, or with potential habitat in the study area

Plant species	Common Name	Status	Source	Found within Study area or Local area	Recorded within the project footprint
Acacia howittii	Sticky wattle	Rr	BR	yes	no
Amphibromus fluitans	River Swamp wallaby Grass	Vk	BR*	yes	no
Arachnorchis orientalis	Eastern spider-orchid	Ee	FIS*	No, and probably wrongly identified in previous study	no
Cyathea cunninghamii	Slender tree-fern	Rv	FIS	no	no
Dianella amoena	Matted flax-lily	Ee	FIS*	no	no
Eucalyptus strzeleckii	Strzelecki gum	Ve	BR*	yes	yes
Eucalyptus yarraensis	Yarra gum	Rk	BR	yes	no
Prasophyllum frenchii	Maroon leek-orchid	Ee	EPBC	no	no
Thelymitra matthewsii	Spiral sun-orchid	Vv	EPBC	no	no
Xerochrysum palustre (syn. Bracteantha palustris)	Swamp Everlasting	Vv	EPBC	no	no

Note: K/k = poorly known in Australia/Victoria, R/r-rare in Australia/Victoria, V/v = vulnerable in Australia/Victoria
BR = Biosis Research. FIS = DSE Flora Information System. EPBC = EPBC Database
* denotes that the species is also listed on the EPBC Database

Biosis Research recorded three species of state conservation significance during botanical surveys for the project. The DSE Flora Information System identified one additional species of state significance with potential habitat in the study area, and four additional species of state significance with potential habitat in the local area, though none of these were found by Biosis Research during their surveys. Table 15 lists these flora species of state significance.

Table 15 Species of state conservation significance recorded in the study area or the local area, or with potential habitat in the study area

Plant species	Common Name	Status	Source	Found within Study area or Local area	Recorded within the project footprint
Cardamine paucijuga s.s.	Annual bitter-cress	V	BR	Yes	No
Chiloglottis jeanesii	Mountain bird-orchid	R	BR	Yes	No
Corunastylis despectans	Sharp midge-orchid	K	FIS	No	No
Dianella longifolia var. grandis	Glaucous flax-lily	V	FIS	No	No
Eucalyptus fulgens	Green scentbark	r	BR	Yes	Yes
Petalochilus vulgaris	Slender pink-fingers	r	FIS	No	No
Platysace ericoides	Heath platysace	r	FIS	No	No
Pterostylis grandflora	Cobra greenhood	r	FIS	No	No

Note: K = poorly known in Australia, r-rare in Victoria, v = vulnerable in Victoria
BR = Biosis Research. FIS = DSE Flora Information System. .

Areas identified by Biosis Research as of high local conservation significance or greater within the study area are shown in Figure 19.

No areas of national conservation shown on Figure 19 are within the project footprint, while Area 3 is of state conservation significance. Area 3 consists of a small remnant of Swamp Scrub in a drainage line just west of Marretts Road.

FAUNA

Biosis characterised the study area in terms of its faunal habitat value (see Exhibit IPRH#18) as follows:

> *"The great majority of the study area therefore, and especially the development footprint, was exotic pasture with very low habitat value to most indigenous fauna. Occasional indigenous trees scattered within exotic pasture do offer limited resources to some vertebrates and we do not discount the possibility that some species additional to those recorded by Biosis Research might utilise such trees. Nevertheless, they are depauperate [degraded) by comparison with remnant patches of woodland and forest that retain a vegetation community structure, even a degraded one."*

Figure 19 Areas of conservation significance within the study area

No indigenous fauna species of national conservation significance was recorded from the study area during the Biosis Research survey, or from the AVW Database for the local area. The EPBC Database, however, identified eight indigenous species that potentially use the local area, although there are no documented records. Of these Biosis Research considered that the spotted-tailed quoll, the southern brown bandicoot, the long-nosed potoroo and the growling grass frog are unlikely to use the study area, while the grey-headed flying-fox, the Australian painted snipe, the swift parrot and the regent honeyeater may be rare visitors to the study area.

Six fauna species (the koala, the great egret, the little egret, the royal spoonbill, the blue-billed duck and the hardhead) were recorded during the survey which satisfy the criteria for state conservation significance, while four others (Australian shoveler, musk duck, grey goshawk and hooded robin) are listed in the AVW database as having been recorded, while the EPBC Database identified the white-bellied sea-eagle as potentially using the local area, although there are no documented records.

13.2 POTENTIAL IMPACTS

13.2.1 OVERVIEW OF PROPONENT'S SUBMISSIONS

In the EES, IPRH sets out the potential impacts on flora and fauna in Section 10.3.3 of Volume 1 (the Main Report), and supported this in Volume 4 (Supporting Study 8) and other exhibits provided to the Panel. A similar framework is set out in Table 16 below.

Table 16 Framework for considering potential flora and fauna impacts

Potential impact	Section in Panel Report	EES reference
Vegetation and fauna habitat —Direct Impacts		
Loss of 1.48 ha of Swamp Scrub	13.2.2 Net Gain	Main Report 10.3.4
Loss of 1.48 ha of Plains Grassy Woodland	13.2.2 Net Gain	Main Report 10.3.4
Loss of areas of local significance comprising roadside vegetation	13.2.3 Residual and other impacts	Main Report 10.3.3
Loss of individuals of significant plants	13.2.2 Net Gain, and 13.2.3 Residual and other impacts	Main Report 10.3.4
Loss of habitat for indigenous fauna, including some significant species	13.2.3 Residual and other impacts, and 13.2.4 EPBC implications	Main Report 10.3.4
Loss of hollow-bearing trees	13.2.2 Net Gain	Main Report 10.3.4
Vegetation and fauna habitat —Indirect Impacts		
Dust raised by earthworks	13.2.3 Residual and other impacts	Main Report 10.3.4

Impact of mine extension on local groundwater	13.2.3	Residual and other impacts	Main Report 10.3.4
Regional biodiversity	13.2.3	Residual and other impacts	Main Report 10.3.4
Threatened species and other Controlling Actions	13.3	EPBC Act	Main Report 10.3.4

13.2.2 NET GAIN

THE POLICY

The Victorian Government's Net Gain policy is set out in *Victoria's Native Vegetation Management — A Framework for Action* (DNRE 2002), tabled as Exhibit IPRH#21. The primary goal for native vegetation management in Victoria is to achieve:

> *"A reversal, across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain."*

A key guiding principle of Net Gain is the retention and management of remnant native vegetation as the primary way to conserve the natural biodiversity across the landscape. The approach required is for proponents to avoid vegetation clearance wherever possible, where it is not possible to minimise it by careful planning, and where losses are still inevitable, to offset those losses.

Where clearing of native vegetation is unavoidable, the loss of vegetation is assessed on a habitat-hectare measurement, where the quantity and the quality of the vegetation class are assessed, and an equivalent offset area is provided (the equivalent offset involves a multiplier of 1.0. 1.5 or 2.0, depending of the conservation significance of the loss). The offset may include gains in extent (new areas of revegetation for biodiversity conservation and land protection) and in quality (improved management of threatening processes such as control of weeds, and supplementary plantings into depleted existing native vegetation.

The habitat-hectare offsets must be provided in a manner that ensures that loss of higher significance vegetation must be predominantly mitigated by improvement of other vegetation of comparable quality, and the revegetation of previously cleared areas will be limited according to the conservation significance of the lost vegetation.

In addition to the habitat-hectare offsets, offsets for the removal of large trees are also required to ameliorate the impact to habitat values caused by the loss of hollow-bearing trees. Where remnant patches of native vegetation that contain large old trees are to be cleared, both protection of other large old trees and recruitment of new trees will be required as part of the offset. Recruitment may either be through plantings and/or through regeneration associated with the protection of other old trees.

Relatively dense stands of scattered old trees that occur within pasture rather than in clearly defined vegetation remnants also require offsets, and these are based on simple replacement ratios, which are given in Appendix 4 of DNRE 2000.

Calculation of the amount of gain associated with the offset actions will be based on an estimate of the improvements that will be realised within 10 years of the actions being initiated.

The terms “patch” and “parcel” are used to describe areas of land to which the Net Gain requirements apply.

The term “patch” is used to describe an area of native vegetation where indigenous species in the understorey have a cover of greater than 10% of the total benchmark understorey cover. Land where the understorey does not meet this threshold does not require habitat hectare offsets.

The term “parcel” is used to describe vegetated land within a single property which has 10% or less of the total benchmark understorey cover. In parcels that are greater than 4 hectares, old tree offsets are specified.

THE PROPONENT’S ASSESSMENT

The Net gain assessment of the project area by Biosis Research comprises two components: habitat scores and tree assessments. The two areas classified as habitats that will be cleared for the project are the 1.48 ha patch of Swamp Scrub near Marretts Road (Area 3 — of state significance) and the 2.79 patch of Plains Grassy Woodland that is part of the Golden Gully Road reserve (an area of high local conservation significance). The habitat hectares for these areas, when the actual habitat scores are taken into account, are:

- 0.68 habitat-hectares of Swamp Scrub (0.64 in Area 3, 0.04 small unfenced area), and,
- 1.17 habitat hectares of Plains Grassy Woodlands.

The tree assessment recorded the following numbers of medium, large and very large trees within each EVC covered by the project footprint:

- Plains Grassy Forest: 36 medium, 39 large and 20 very large trees;
- Plains Grassy Woodland: 30 medium (29 in remnant vegetation and 1 isolated tree), 22 large and 8 very large trees;
- Swamp Scrub: 37 medium, 53 large and 22 very large trees;
- Swampy Riparian Woodland: 41 medium, 27 large and 42 very large trees.

Of these 377 trees, offsets are not required for 29 of the medium trees within the Plains Grassy Woodland EVC.

THE PROPONENTS PROPOSED OFFSETS

The required habitat-hectare offsets required are:

- 1.34 habitat-hectares of Swamp Scrub (2 x 0.64 + 1.5 x 0.06); and,
- 2.34 habitat-hectares of Plains Grassy Woodlands (2 x 1.17).

The habitat-hectares offsets may be in the form of:

- enhanced management of existing secure vegetation; and/or,
- revegetation of secure sites, to a maximum of 10% of the offset (NRE 2002).

With respect to old tree offsets, IPRH have adopted the “Protect and Recruit” option. Their basis for selecting this option is that there are a significant number of degraded road reserves

in the vicinity that can be fenced 30 – 40 metres further out. The Net Gain offset requirements on this basis have been tabulated below in Table 17.

Table 17 Quantification of old tree offsets.

EVC	< 8 trees / ha		> 8 trees / ha		Remnant Native Vegetation		Totals	
	Protect + Recruit		Protect	Recruit	Protect	Recruit	Protect	Recruit
SS	16 M, 40 L, 56 VL	+ 560	84M, 264L	1,740	64 L	320	524	2,620
PGW	1M, 2L, 6 VL	+ 45	NA	NA	224 L	1,120	233	1,165
SRW	72 M, 82 L, 210 VL	+ 1,820	NA	NA	NA	NA	364	1,820
PGF	27M, 72L, 80 VL	+ 895	22 M, 20 L	210	NA	NA	221	1,105
TOTAL							1,342	6,720

Notes: SS = Swamp Scrub, PGW = Plains Grassy Woodland,
SRW = Swampy Riparian Woodland, PGF = Plains Grassy Forest

M = Medium, L = Large, VL = Very Large

IPRH advised the Panel that it will meet its Net Gain obligations through provision of offsets, including:

- protection and augmentation of Eel Hole Creek remnant vegetation;
- protection of scattered trees in unused road reserves;
- protection and enhancement of Crown frontage on Morwell River;
- protection and enhancement of IPRH wetlands;
- protection and enhancement of Yinnar-Driffield Road reserve.

IPRH also advised that it has planted over 100,000 trees and 11,000 understorey plants including Strzelecki and Yarra Gums since 1996. IPRH would anticipate that these plantings would contribute to its Net Gain obligation, in accordance with the note about plantings since 1989, on the bottom of page 24 of *Victoria's Native Vegetation Management—A Framework for Action*.

The areas proposed for the Net Gain offsets are shown in Figure 20.

It should be noted that the proposed areas for Net gain offsets shown on Figure 20 do not include sites for the Plains Grassy Woodland offset. Stephen Mueck of Biosis (for IPRH) advised:

> *"No potential offset site has yet been identified for the proposed loss of Plains Grassy Woodland. Identification of suitable sites is likely to require a detailed search and it is proposed to conduct this search, in consultation with DSE, after project approval. The offset requirement of 2.34 habitat hectares of Plains Grassy Woodland is relatively small and finding suitable offsets post project approval but before loss occurs is within the guidelines of the framework and in line with other recent project approvals."*

Figure 20 Proposed Net Gain Offsets

Key elements of IPRH's Net Gain proposal, which is based on the protection and recruitment option, are:

- enhancement of vegetation along Eel Hole Creek, including the construction of billabongs and flood runners within the floodplain remnant of the creek, with plant stock and seeds from the Swamp Scrub remnant which will be lost being used to seed the constructed billabongs and flood runners. The improvement of remnant vegetation along Eel Hole Creek has the potential to provide 0.63 habitat-hectares (about half the required amount for Swamp Scrub) within existing fenced areas, using the improvement management option;
- the protection of some 556 Strzelecki Gums in unused road reserves and land owned by IPRH;
- the protection and enhancement of Crown land along the Morwell River and its tributaries. IPRH has commenced discussion with WGCMA to develop a plan to restore the riparian corridor of the Morwell River and its tributaries or other high-priority rivers with indigenous vegetation similar to that affected;
- augmentation of the existing wetlands and construction of terminal wetlands at the outlets of MRD5 and the Wilderness Creek diversion.

The program and ongoing monitoring of its progress in achieving a Net Gain will be developed and implemented in consultation with DSE and the WGCMA.

13.2.3 RESIDUAL AND OTHER IMPACTS

REGIONAL BIODIVERSITY

The proponent has stated in the EES that:

> *"Because the biodiversity of the region has been so significantly reduced (mainly due to clearing for agriculture), further loss of even small areas may have disproportionately large impacts on the overall remnant natural values of both the local area and the region. However, there is considerable scope to improve the conservation value of areas through revegetation and rehabilitation of existing remnants."*

The proponent has also stated that propagation materials (seeds and salvaged plants) for revegetation and habitat improvement works will be sourced (in part) from vegetation proposed to be cleared.

Biosis Research concluded that potential ecological impacts are relatively low.

LOSS OF AREAS OF LOCAL SIGNIFICANCE COMPRISING ROADSIDE VEGETATION

The proponent reported in the EES as follows:

> *"the loss of habitat caused by the project development is unlikely to contribute to fragmentation of habitat, as the areas lost are at the edge of linear strips of vegetation and do not currently link larger, more intact areas. However, loss of scattered trees and other patches of vegetation in this area may reduce the movement of more-mobile species capable of using these features as stepping stones through the area.*

LOSS OF INDIVIDUALS OF SIGNIFICANT PLANTS

The proponent described the loss of some 155 Strzelecki Gums as being 15% of the 1039 in the Study area, and 0.2% potentially of the total Strzelecki Gum population. The proponent stated that all the affected Strzelecki Gums were either in road reserves or on agricultural land, and in poor ecological condition. They were not managed for their ecological values and future opportunities for regeneration are limited.

The proposed project footprint will also result in the loss of two recorded individuals of green scentbark, some 2% of the estimated 100 individuals within the study area. Both trees are in very poor ecological condition.

The Net Gain offsets for large trees have been described in 13.2.2 above.

LOSS OF HABITAT FOR INDIGENOUS FAUNA, INCLUDING SOME SIGNIFICANT SPECIES

Tables 10.6 and 10.7 in the EES list the potential impact of the proposal on fauna of national and state significance, respectively. The tables are not reproduced here. The assessment made by Biosis Research is that the impacts range from ”None” (Long-nosed potoroo, which will not occur within the study area), through “Negligible” (15 other species), to “Low” (for Swift Parrot, the Growling Grass Frog and the Koala).

The loss of hollow-bearing trees has the potential to affect a range of fauna present in the study area. The proposed project will remove 233 trees which, based on their large size, are likely to contain hollows, and a further 144 trees that may have the potential to form hollows in the future (medium-sized trees).

To ameliorate the loss of hollow-bearing trees the proponent intends to place nest boxes in revegetated areas once the trees are large enough to support them. The Net Gain offsets include the protection of mature trees.

DUST AND GROUNDWATER IMPACTS

Observation and experience with vegetation close to the existing mine, and along unsealed roads, indicated that neither dust from the earth moving and mining operations, nor the impact of dewatering the underlying aquifer, are likely to cause significant impacts.

13.3 EPBC ACT

13.3.1 REFERRAL

IPRH made a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) to the Commonwealth Department of the Environment and Heritage (DEH), principally in relation to potential impacts on the Strzelecki Gum, a listed threatened species under that Act.

The delegate for the Commonwealth Minister for the Environment and Heritage determined that the impact on the Strzelecki Gum is potentially significant, and accordingly declared the project a ‘controlled action’, citing Sections 18A and 18a (listed threatened species and

communities) as the controlling provisions. The Commonwealth has accredited the Victorian EES process as the required level of assessment under the EPBC Act.

The EPBC Act requires assessment of the impact of the project on:

- listed threatened species (including in the "extinct in the wild", "critically endangered', "endangered" and "vulnerable" categories; and,
- listed threatened ecological communities in the "critically endangered" and "endangered" categories.

While no offset guidelines are specified under the EPBC Act, the Commonwealth will be satisfied if the Victorian Net Gain offsets are met, provided the "like for like" requirements are interpreted as requiring Strzelecki Gums.

The only relevant plant species found on the site was the endangered Strzelecki Gum. As reported above (Sections 13.2.2 and 13.2.3) the residual impacts on this species will be low. Biosis note in Section 10.3.6 of the EES Volume 1, Main Report:

> *"However plantings within proposed offset sites (see 'Net Gain' in Section 10.3.4 above) will increase both the number of individuals and their long-term viability if the ecological management objectives of self-sustaining populations can be met."*

In relation to other EPBC Act controlling provisions, the EES states that:

> *"Ramsar Wetlands. The project is in the catchment of the Ramsar wetland of the Gippsland Lakes (see Section 10.4.5). In the short term, the environmental management measures (see Section 10.4.5 and Chapter 12) are intended to protect water quality downstream of the stream and road construction works; and, as discussed in Section 10.4.5, potential short-term minor increases in sediment load should not impact the ecological function or environmental values of the Ramsar site. In the long term, the re-establishment of the Morwell River in a more natural form should contribute to the general biodiversity objectives of the act by the terrestrial and aquatic habitat created and by the linkages between existing habitat that will be re-established.*
>
> *Migratory Species. Supporting study 8 and Section 10.3.2 above have noted 29 birds from the local area listed as 'migratory' under the EPBC Act and that the area of and around the West Field project is unlikely to support a substantial proportion of the total population of any of these species."*

IPRH submitted that the proposed Net Gain offsets would increase the number of Strzelecki Gums and their long-term viability, thus satisfying the requirements of the EPBC Act in respect of the threatened flora.

IPRH addressed threatened fish species in Section 10.4.5 Aquatic Ecology of the EES, Volume 1 Main Report, without referencing the discussion to the EPBC Act. The issue is addressed in Section 13.3.3 below.

13.3.2 SECOND REFERRAL BY EDO

EDO advised the Panel that on 18 June 2004 it had written to DEH seeking reconsideration of the decision concerning the controlled action and the controlling provisions, to widen the controlling provisions to include the use of water by the proposal and also the status of the Gippsland Lakes Ramsar Wetland. The Panel does not have the original letter from EDO to

the Commonwealth, but has EDO's Exhibit EDO#8 which is a copy of the acknowledgement from DEH.

Subsequently IPRH tabled a copy of its response (prepared by Enesar Consulting Pty Ltd) to DEH on the matters raised (IPRH#51, in part). These are listed as:

1. The effects of groundwater extraction on the Gippsland Lakes Ramsar Wetlands.

2. The effects of surface water by IPRH on the Gippsland Lakes Ramsar Wetlands.

3. The contribution of the action [development of West Field] to any reduction in rainfall in the catchment of the Gippsland Lakes from anthropogenic emissions of greenhouse gases.

4. Potential impacts on threatened or rare native fish species including Australian grayling, dwarf galaxias, Australian bass and pouched lamprey.

The documents included consideration of the water balance for the power station and groundwater pumping (see Chapter 14 below), and a detailed review of the potential impacts on threatened fish species. With respect to this last matter, it appears that DEH drew attention to the fact that consideration of threatened or rare native fish species did not require any amendment of the controlling provisions; they are already included under the terms of the original decision.

With respect to Item 3 above, the Panel notes the advice of IPRH to DEH that it has commissioned a separate report from the CSIRO on the matter.

Part of the additional information that IPRH publicly exhibited prior to the reconvened hearings was a *Response to Department of the Environment and Heritage on request for reconsideration under Section 78 of EPBC Act (Effect on Rainfall in Gippsland Lakes Catchment),* (Submission IPRH#54, and also forming Attachment F to IPRH#55). IPRH#54 included a covering report prepared by IPRH, and the report by CSIRO referred to above.

In IPRH#55, IPRH summarise the information in the CSIRO Report as follows:

> *"The CSIRO report predicted that emissions from the West Field development would change global atmospheric temperatures by between 0.0000008°C and 0.0000023°C in 2030 and that in the event HPS was closed in 2011, the change in temperature would be between 0.0000018°C (*stet: this should be 0.000018°C *) and 0.000054°C for replacements based on black coal, and between 0.000043°C and 0.000128°C for replacements based on natural gas using combined cycle gas turbine technology In predicting the potential change in global atmospheric temperatures, CSIRO noted that there was no direct link from regional emissions to enhanced regional climate change.."*

A revised CSIRO report was provided by email after the conclusion of the Panel Hearing (IPRH#63). Several matters referred to above were clarified, and the estimates of global temperature changes were adjusted in line with further data provided by IPRH (see also Sections 18.6 and 18.7 below).

Panel Discussion

The Panel had some difficulty in understanding why "the predicted emissions from the West Field development" would change global warming by two orders of magnitude less than the

potential reductions of closing HPS in 2011 and replacing it with combined cycle gas turbine technology. The answer seems to lie in the assumptions taken by CSIRO, based on the statement by IPRH given in their memo to CSIRO that "the proposed development would result in an additional emission of 3.6 Mt of CO_2-e over the life of the development". The CSIRO report represents the 3.6 Mt as the increase to CO_2 emissions as a result of the development of the West Field Project (relative to a notional baseline of Hazelwood continuing as present until 2031). In fact, the 3.6 Mt is the amount of CO_2 emissions expected from construction of the river diversion, overburden removal and mining of the brown coal in Phase 2 of the West Field Project. The notional baseline seems unrealistic and almost irrelevant. IPRH has stated that without access to the Phase 2 coal, HPS will close. There is no alternative supply of coal on which to base such a notional baseline. What, to the Panel, seems more relevant is the statement by IPRH in their memo to CSIRO that "*If Phase 2 of the West Field Project was not developed, a potential estimated saving of 357 Mt of CO_2-e would be achieved under a best case scenario.*"

The potential effect of the proposal to reduce rainfall in the catchment of the Gippsland Lakes from anthropogenic emissions of greenhouse gases should be based on the 357 Mt of CO2-e estimated saving if the Phase 2 of the West Field Development did not occur, or by the lesser amounts detailed in Section 18.6 below if some other replacement strategy was adopted. The updated advice from CSIRO in IPRH#63 estimates the potential increase in global temperature would be between 0.000090°C and 0.000271°C in 2030. These increases, and their consequential effect on rainfall events, are still very small, if taken in isolation to other emissions world wide.

The final quotation from IPRH#55 given above also requires comment. The Panel pointed out to IPRH that the following sentences of the CSIRO report (see IPRH#54, Whetton and Durack, page 6) go on to say, in part, "…*Correspondingly, regional reductions in CO2 emissions would reduce global warming and associated regional impacts*." IPRH acknowledged this omission.

13.3.3 POTENTIAL IMPACTS ON THREATENED FISH SPECIES

The EES, in section 10.4.5, recognises that four fish species native to this area are classified as either rare or vulnerable. While these are discussed in the EES and Supporting Study 7, the most thorough assessment is included in the Enesar report included in IPRH#51, a "*Response to Department of the Environment and Heritage on request for reconsideration under Section 78 of EPBC Act*". The species under threat are as follows.

Australian grayling (Prototroctes maraena) and **dwarf galaxias** (Galaxiella pusilla): Both species are listed as 'vulnerable' under the EPBC Act and 'threatened' under the Victorian Flora and Fauna Guarantee Act 1988.

Australian bass (Macquaria novemculeata) and **pouched lamprey** (Geotria australis): Both species are listed as 'threatened' under the Victorian Flora and Fauna Guarantee Act but are not listed under the EPBC Act.

Enesar advise that:

- the Australian grayling is not as rare as previously believed;
- the Australian grayling, the Australian bass and the pouched lamprey need to migrate to and from estuaries or the sea to complete their lifecycle;
- it has not been confirmed by a direct scientific sampling program that any of the four fish species occurs in the Lower Morwell River at this time.

These fish species are considered to be threatened by diminished habitat due to land clearance and associated impacts. It is extremely doubtful that any exist upstream of the current piped section of the MRD2. Any downstream populations may be impacted to a minor degree by MRD5 works in the short term, though measures will be taken to minimise downstream silt and turbidity during construction. In the longer term, the provision of a more natural river and the increase in wetlands should assist in improving water quality, while the restoration of the longitudinal connectivity of the river and the significantly improved habitat over the length of MRD5 will address the current constraint (the piped section). The outcome of MRD5 would therefore be potentially positive to all four species in the longer term.

13.4 SUBMISSION BY DSE

The only submission critical of the flora and fauna treatment in the EES (save for the reference by EDO under the EPBC Act described above in Section 13.3.2) was made by DSE. Working together with CMA's and Local Government, DSE is responsible for administering the Net Gain requirements in Victoria.

DSE supported many aspects of the IPRH approach, study methods and Net Gain proposals, but was critical of a number of aspects of the flora and fauna assessment. Steve Mueck of Biosis Research provided a thoughtful and comprehensive response to the issues raised by DSE in Exhibit IPRH#18 and verbally to the Panel. A list of the issues raised by DSE (see also DSE#2), and a summary of the response by Steve Mueck of Biosis Research on behalf of IPRH is provided in Table 18 below. Comments on fish species were addressed principally by Barton Napier.

Table 18 Criticisms of the Flora and Fauna investigations undertaken by Biosis

DSE Criticism	Biosis Research response
The fauna survey, which was not considered adequate, and the scant Information on site usage by fauna. DSE recommended that a more comprehensive survey be conducted, prior to the commencement of works, to provide a basis against which monitoring results can be compared.	The great majority of the study area, and especially the proposed development footprint, was exotic pasture with very low habitat value to most indigenous fauna. …For these reasons targeted fauna survey effort was largely concentrated on small remnants of indigenous vegetation and waterways that were most likely to offer resources to native fauna.
The existence of the nationally endangered Eastern Spider Orchid on the boundary of the project footprint should be investigated by field inspection.	The record of Eastern Spider Orchid in this area is definitely an error. This general locality has been inspected and is not suitable habitat. I have also spoken to Geoff Carr (an author of this species) and he has confirmed that this recorded location is in error. No further survey of this area for this species is warranted.
The extent of an endangered EVC, Plains Grassy Woodland, is not indicated in the mapping.	Correct, but its mapping was not considered necessary. Note that a Net Gain offset has been calculated for this Plains Grassy Woodland along Golden Gully Road, and it is referenced in the Net Gain assessment.
With respect to significant fauna species: (i) appropriate survey should be conducted to determine the	(i) Survey for Growling Grass Frogs was undertaken during their calling season. If this species is detected during other works within the study area

presence of the Growling Grass Frog; (ii) impact on Koala foraging and movement has not been quantified; (iii) an assessment of the impacts of the construction works and the long term effects of the pit void on fauna species of less than state significance should be provided.	then appropriate conservation measures should be taken. Our survey suggests this is unlikely although not impossible. (ii) The Koala is not listed under any category of threat in Victoria, although the South Gippsland genotype is considered to have particular conservation values. Quantification of Koala foraging and movement within the study site would require intensive and long-term investigation, particularly as there is little suitable habitat and that Koala usage would therefore be expected to be difficult to document. (iii) Construction works will result in habitat loss, fragmentation and a loss of habitat connectivity and structure for locally significant species over both short and long time frames. However the site currently is highly modified and provides little habitat to any but very common species of the Gippsland Plain Bioregion.
Fauna habitat impacts have been understated or not quantified, in relation to the value of lost scattered trees and other patches of vegetation as "stepping stones" through the area, and the failure to address local scale options to offset impacts.	Supporting Study 8 notes that the principal values to mammal fauna of corridors, such as roadside eucalypts, occur when they offer protected routes between larger blocks of habitat. Little such connectivity is provided within the footprint of the project.
Elaboration of the intended nest box provision should be provided, including monitoring and maintenance provisions.	The provision, monitoring and maintenance of nest boxes are outlined on page 67 of Supporting Study 8 by Biosis Research.
Green Scentbark and Yarra Gum could be targeted for similar protection and recruitment as is planned for the Strzelecki Gum.	Agreed, provided their use does not cause problems or conflict with offset objectives of the Framework. IPRH is happy to include Yarra Gum in offset sites where appropriate.
Further details of the proposed Net Gain offset mitigation works are required, including the target area and the quality planned, security arrangements, and demonstration that landholders will allow the proposed works on their property or leasehold.	All offset sites require DSE approval and these negotiations would be conducted after project approval. No potential site has yet been identified for the offset requirement of 2.34 habitat hectare of Plains Grassy Woodland. …finding suitable offsets post project approval but before the loss occurs is within the guidelines of the framework and in line with other recent approvals.
Clarification is required regarding the mitigation of the Plains Grassy Woodland removal.	See above.
Further details are required regarding the proposed translocation of the Swamp Scrub EVC in order to assess its potential success.	The proposed translocation of material associated with the clearing of the Swamp Scrub near Marretts Road to Eel Hole Creek will be experimental. The details of such a proposal are yet to be determined, and the potential success of such a proposal should not be

	presumed.
Specific habitat requirements for indigenous fish species should be determined and incorporated into channel design and construction.	The design of the proposed MRD5 has incorporated suitable fish habitat, particularly the restoration of longitudinal connectivity to the Morwell River, the loading of woody debris and the restoration of floodplain and hydrological processes (see IPRH#51, Response to DEH). Note also the presence of pools in the low flow design.
Control methods preventing use of the new river channel by exotic fish species should be developed	Comment by Barton Napier at the Hearing that it is doubtful if this can be done.
Impacts **of** recreational fishing on environmental values, such as native fish, should be separated from impacts **on** fishing.	Noted and agreed by IPRH.
Clarification is required on the number, intent, extent and duration of monitoring programs to be initiated, and on the adaptive management which may be undertaken as a response to the results of monitoring.	See Environmental Management, Chapter 19, below.

The Panel requested that DSE meet with Steve Mueck of Biosis Research to try to resolve outstanding issues between them, particularly in respect to the need for further monitoring. This discussion was held on 4 August 2004, and DSE provided their considered requirements to the Panel in Exhibit DSE#3, "Addendum to DSE Submission".

In summary, DSE advised as follows:

- additional small mammal trapping is suggested;
- discussions should be held with Ms Lindy Lumden, DSE's bat specialist, in order to develop and implement an appropriate survey plan to assess the local situation more fully;
- further observation for koalas should be continued as part of other survey work being conducted. Should the project proceed, areas should be inspected prior to tree removal and any Koalas found should be relocated to other appropriate adjacent areas away from the any proposed works;
- an additional three hours of active spotlight searching for Growling Grass Frogs over two nights should be conducted;
- additional survey for small birds is suggested, and baseline survey should also be conducted at offset sites. Survey hours to be agreed upon following consultation with DSE;
- a broad scale invertebrate survey specifically at the Swamp Scrub patch west of Marretts Road should be considered as a possibility by IPRH;
- other matters have been clarified to DSE's satisfaction. The above suggestions were arrived at jointly by DSE and Biosis, and would provide additional information on the impact of the proposal on local fauna.

On 13 September, after the conclusion of the Hearing, Barton Napier advised the Panel (by email) as follows:

> *"…You will recall that IPRH was concerned about DSE's addendum and were to get back to the Panel with their position on the scope of monitoring to be carried out.*
>
> *In relation to the above matters, I have had numerous discussions with DSE and have drafted an outline of the proposed net gain offset monitoring program and a consultant brief for the additional survey to be undertaken. Those documents are currently with DSE and IPRH for final review and endorsement, after which they will be forwarded to you for your consideration."*

Subsequently on 20 September 2004 Barton Napier advised the Panel (by email) that agreement had been reached, and attached three documents as follows:

- an outline of a terrestrial flora and fauna monitoring program for Net Gain offsets;
- a consultant brief for a Supplementary Fauna (Vertebrate) Survey and Net Gain Assessment;
- a letter dated 14 September 2004 from the DSE Regional Manager Gippsland, endorsing the outline of the proposed supplementary fauna survey.

The first of these documents is attached as Appendix G. The new information provided in this document is:

- agreement to not further pursue the invertebrate field survey;
- preliminary proposals for the offsets for the Plains Grassy Woodland EVC, in unused road reserves and in the Cemetery and *E. pauciflora* conservation reserves.

13.5 DISCUSSION

In view of the extensive study, discussion and review of the flora and fauna issues provided in the EES, the Supporting Study No 8, the Submissions by DSE, and responses by Biosis Research and Enesar on behalf of IPRH, the Panel has little to add, but to give its conclusions and recommendations.

Before doing this, the Panel wishes to set out its perspective on the flora and fauna issue. The key elements are:

- recognition of the significant past efforts by IPRH to protect and enhance the quality of vegetation within its area of control, in particular the establishment of wetlands and the planting of some 100,000 Strzelecki and Yarra Gums;
- IPRH's constructive engagement with DSE and the Panel on the issues of concern to DSE, and willingness to seek a negotiated agreement even in areas where they clearly felt there was little technical merit in the proposals put forward by DSE;
- the reality that the project footprint is in cleared farmland that has, with minor exceptions as documented in the EES, little overall remnant vegetation of any significant quality;
- the significant improvement to the quality of the river environment which will result from replacing the piped low flow section of MRD3 with a more natural and sinuous above ground treatment in MRD5, designed and to be planted and established to provide habitat values for fish and flora;

- the fact that DSE did not apparently outline to IPRH their concerns about the flora and fauna component of the study until they made their written submission on the exhibited documents, even though DSE convened the Technical Reference Group with the express purpose of ensuring that the EES met the requirements of Government;
- an appreciation of the environmental credentials and reliability of IPRH, developed through their past performance, their operation of a third-party-certified Environmental Management System (ISO 14001) and maintaining an EPA Accredited Licensee status, and their commitment to the Panel process.

Overall, the Panel was satisfied with the scope of studies undertaken by IPRH, the way these studies had been carried out, the results of the studies, and the proposals for Net Gain offsets by IPRH. The Panel was generally satisfied with the Biosis response to the issues raised by DSE concerning deficiencies in the studies.

Turning now to the negotiated arrangements concluded between DSE and IPRH, the Panel commends IPRH for its willingness to make every effort to resolve outstanding differences with DSE. With respect to further fauna studies, the Panel is inclined to agree with Mr Steve Mueck of Biosis, who advised the Panel that the sought for additional faunal studies would be of limited practical value, given the heavily degraded nature of the study area, and the difficulty of using any data found in determining the success of mitigation works. Notwithstanding this view, the Panel supports the negotiated agreement on the additional field survey for fauna.

One further matter that arose in relation to the Net Gain offsets was the way in which they would be permitted, managed and monitored. Where impacts and ameliorative measures are within a Mining Licence area, the Work Plan usually provides for an Environmental Management Plan to be prepared that covers the relevant management and monitoring requirements. DPI have submitted that the Work Plan is generally constrained to matters within the Mining Licence boundary, although wider social impacts (such as noise and dust impacts) have in the past been included within the scope of the EMP and of the Environment Review Committee.

In the present proposal, there are a number of impacts, which occur outside both the area of Mining Licence MIN5004, and outside the area for which IPRH has prepared Mining Licence applications.

The Panel sought advice from IPRH, DSE and DPI as to the arrangements that should be made to ensure that the Net Gain offsets were properly permitted, with clear responsibilities for management, monitoring and oversight. This matter will be further discussed in Chapter 21, Environmental Management and Section 22, Approvals.

13.5.1 CONCLUSIONS ON FLORA AND FAUNA

It is doubtful that any of the threatened fish species exist in the reaches of the Morwell River upstream of MRD2. The implementation of MRD5 would allow the opportunity for the species to once again use the upper reaches of the river in the longer term.

The Panel concludes that the work undertaken by IPRH, and by Biosis on its behalf, to investigate flora and fauna impacts, and to provide

ameliorative measures, has met most reasonable expectations. The Panel notes that there will be ongoing discussions between IPRH and DSE to finalise the Net Gain offset requirements, as is the usual case following project approval.

The Panel supports the negotiated agreement between IPRH and DSE for the undertaking of some limited additional fauna surveys.

The Panel concludes that the studies undertaken, and the Net Gain offsets to be finalised to the satisfaction of DSE, will satisfy the requirements of the *Flora and Fauna Guarantee Act 1988*, *Victoria's Native Vegetation Management — A Framework for Action*, and the controlling provisions of the EPBC Act which have been applied to the project (listed threatened species and communities).

The potential effect of the proposal to reduce rainfall in the catchment of the Gippsland Lakes from anthropogenic emissions of greenhouse gases should be based on up to 357 Mt of CO_2-e estimated saving if the Phase 2 of the West Field Development did not occur. The potential increase in global temperature would be between 0.00009°C and 0.00027°C in 2030. These increases, and their consequential effect on rainfall events, are still very small, if taken in isolation to other emissions world wide.

Overall, the proposal for the Fifth Morwell River Diversion and the mining within West Field Phase 2 will re-establish a more natural regime for the Morwell River, while the "net gain" offsets and restoration of the riverine system and wetlands should satisfactorily mitigate the impacts of the proposal on flora and fauna, and may improve ecological values.

13.5.2 RECOMMENDATION ON FLORA AND FAUNA

The Panel recommends that in regard to flora and fauna issues, and subject to the statutory conditions and monitoring and management requirements set out in the recommendations in Sections 21.2.2 and 22.3.2 below, the further limited fauna surveys to be undertaken, and the Net Gain offsets to be finalised to the satisfaction of DSE:

- **the requirements of the *Flora and Fauna Guarantee Act 1988* and the requirements under *Victoria's Native Vegetation Management—A Framework for Action* will be met;**
- **the controlling provisions of the EPBC Act which have been applied to the project (listed threatened species and communities) will be satisfied, and such advice should be provided by the Minister for Planning to the Commonwealth.**

14. GROUNDWATER EXTRACTION AND WATER USE

14.1 BACKGROUND

The EES Assessment Guidelines prepared by DSE (and enclosed with the EES as Attachment 1) list, as key environmental issues with respect to water use:

> *"Ground water extraction (dewatering) and potential subsidence, due to the extended development of the West Field.*
>
> *Environmental resources (eg water) required to achieve the intent of any rehabilitation concept plan and the short-long term impact of the commitment of environmental resources to final rehabilitation."*

The guidelines point out (in section 4.7.6) that the EES should also provide an assessment of potential short and long term impacts on biodiversity, ecological communities and habitats:

> *"Any threatened or migratory species or communities listed under the Flora and Fauna Guarantee Act 1988 or EPBC Act 1999."*

The Gippsland Lakes host migratory bird species and are included in the Ramsar Agreement.

The Guidelines also refer to Ground Water and Regional Subsidence (section 4.7.8):

> *"Coal mining operations require the depressurisation (dewatering) of groundwater aquifers associated with the coal seams to ensure mine stability. IPRH holds a Groundwater licence to extract water from within the mining licence boundary to facilitate the mining of coal. Administration of the licence has been delegated by the State Government to Southern Rural Water. The licence requires the holder to comply with the allowable extraction rates, compensate any existing authorised groundwater users for adverse impacts deemed to have been caused by the mine's extraction and to undertake a regional monitoring program.*
>
> *Through the application of changed practices (including dumping overburden in the mine) IPRH are reducing the extent of aquifer depressurisation. However the combined effect of dewatering aquifers for various coalmining operations in the Latrobe Valley is regional land subsidence. The effect of regional subsidence is well understood as a consequence of extensive monitoring and modelling undertaken by electricity generators and Southern Rural Water. Monitoring and reporting of regional subsidence is the responsibility of the Regional Groundwater Committee.*
>
> *The EES will need to describe the environmental impacts associated with the project's groundwater extraction, particularly additional impacts on regional subsidence associated with extending the West Field."*

A planning and design objective of IPRH for the development of the West Field Project (see section 1.5 of the EES) is to:

> *"To avoid and minimise impacts on the beneficial uses of surface water and groundwater."*

14.2 MINE STABILITY AND SUBSIDENCE

14.2.1 CURRENT PRACTICE

In section 6.9.2 of the EES, IPRH point out that mining can cause land to subside:

- locally when stress relief from excavated batters causes batter instability;
- regionally through consolidation after aquifer depressurisation (extraction).

Horizontal movement within the mine is caused when the removal of coal and overburden releases horizontal pressure and incidental hydrostatic pressure in coal-joint systems within the batters. Vertical settlement (heaving) is due to settlement caused by the release of coal water pressure and depressurisation of underlying aquifers. At the mine face, tilting of batters can be caused by excessive water pressure in coal joints and by the displacement of one block of coal relative to another along the coal joints.

IPRH have initiated a series of stability test bores that are monitored quarterly to determine water pressures in the coal batters. They have also established a line of survey pins that are monitored regularly to determine movement (which can be converted to a displacement vector) to calculate ground strain to assist in anticipating further batter displacement. Extensometers are also used to reveal subsurface movement between the coal and non-coal strata.

Recharge areas at relatively high elevations create high pressures in the confined aquifers of the Latrobe Valley. The removal of overburden and coal reduces the weight of the strata overlying the aquifers. This release of pressure needs to be countered by lowering of aquifer pressures, in order to prevent heaving of the mine floor and ensure mine stability and safe operating conditions.

The SECV began depressurising the aquifers at the Hazelwood Mine by extracting groundwater from the Morwell (or Morwell 1) aquifer and the Traralgon (or Morwell 2) aquifer in 1960 and 1969 respectively. IPRH holds groundwater extraction licence No 2007412 under the *Water Act 1989*, valid until September 2025, for the aquifer depressurisation system. However, as water is removed from the aquifer, the ground around the mine will sink to compensate for the volume of water lost by the pumping process. Ground level surveys indicate that the maximum subsidence due to aquifer depressurisation is 2,552mm in the vicinity of the Hazelwood Mine and 1,462mm near Loy Yang mine. Subsidence reduces rapidly away from the mines to less than 500mm over a large area.

The Regional Groundwater Committee was established in 1995 to monitor ground water extraction and its impacts and to model and predict future scenarios. The committee has representatives of DPI, Southern Rural Water and the three Latrobe Valley mine operators. IPRH is an active participant in the Regional Groundwater Committee and provides its share of funding for regional monitoring to enable regional groundwater levels and subsidence to be measured and predicted into the future. The Panel understands that this arrangement will continue, and will cover activities associated with Phase 2 of West Field.

The mine drainage system is based on a gravity feed system for surface run-off, collecting the dirty water on the base of the pit where it is treated in settlement ponds prior to pumping to the works effluent pond. There it is treated by flocculants before discharge into the Hazelwood cooling pond. Groundwater extracted to reduce aquifer pressure is pumped into aeration ponds prior to being pumped into the Hazelwood cooling pond. This water is clean and hot (35 to 50 degree C) and is used by a commercial flower farm to heat hot-houses during the

cooler months. Water from the aeration ponds can also be directed to the fire service system and used for dust suppression.

14.2.2 FUTURE GROUNDWATER USE

Figure 21 shows a schematic hydrogeological section through the three Latrobe Valley mines. The main system impacting on the Hazelwood mine is the Traralgon Formation Aquifer System (TFAS, shown in dark blue on Figure 21) followed by the Morwell Formation Aquifer System (MFAS, green and light blue) and a surface or shallow aquifer system. Low volumes of water are extracted from the surface system and the Morwell system for domestic and agricultural purposes in the eastern Latrobe Valley.

Target aquifer pressure levels are set to determine the amount of depressurisation required to prevent catastrophic floor heave in the mines. The main measure to meet the depressurisation requirements is extraction of ground water from the Traralgon and Morwell aquifers. Figure 10.13 in the EES shows that as mining has progressed, extraction has reduced from a combined rate of about 35 GL/year in 1974 (as the mine was stabilising) to about 16 GL/year in 2000, and that the aquifer pressure level (piezometric level) has remained at a level of – 60 metres to – 75 metres since the late 1970's.

Coal winning from the Hazelwood mine commenced in 1956 and significant ground movement occurred in the Morwell township into the mid '70's (60 to 120 mm/year). As depressurisation techniques were introduced, this reduced to 25 to 50 mm/year in the 1980's and to 10 to 20 mm/year in the 1990's. No ground movement claims have been made against the SECV or the Hazelwood mine since 1987.

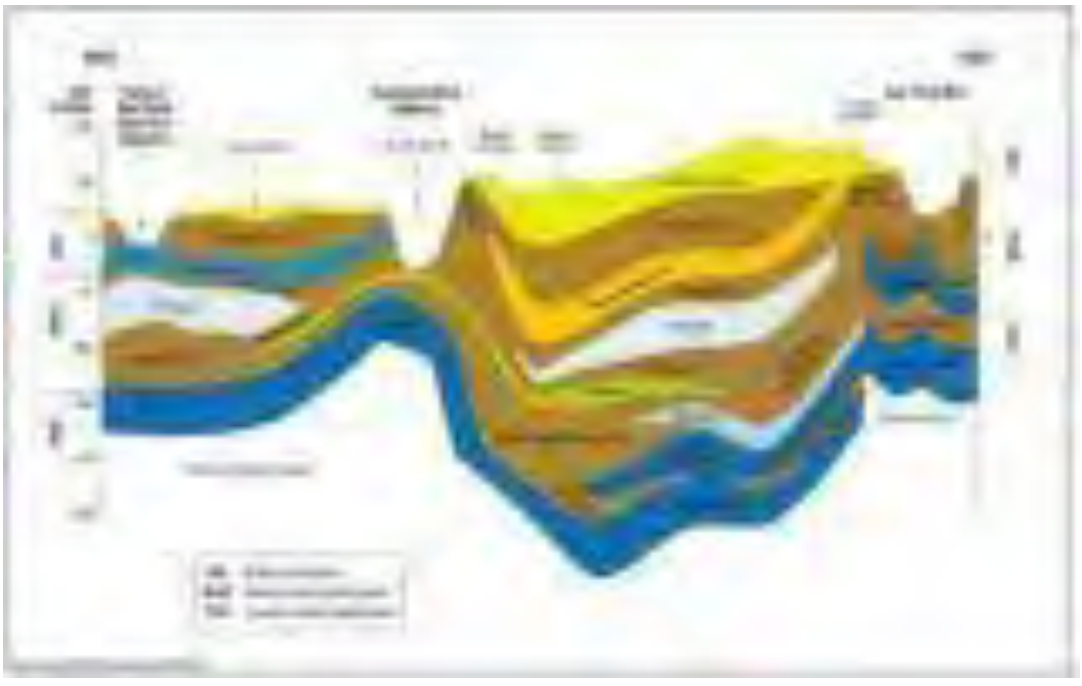
14.2.3 GROUNDWATER EXTRACTION ISSUES

There are a number of potentially conflicting but linked issues relating to the extraction of ground water:

- the need to depressurise the aquifers to facilitate safe mining practices;
- the use of aquifers from the depressurisation process to 'top-up' the cooling water system for the Hazelwood Power Station in order to minimise the use of surface water for this purpose;
- the potential impact of subsidence in surrounding areas due to groundwater extraction;
- the need to minimise the extraction of groundwater to ensure its long term availability for other urban, domestic and agricultural uses; and,
- the need to insure aquifer extraction does not harm ecosystems 'downstream' of the mine (the Gippsland Lakes).

Within the mine, IPRH have a system of aquifer observation bores that are monitored on a regular basis. Stability observation bores are also installed along the rim of the mine to measure water pressures in coal batters to evaluate batter stability. Aquifer pressure distribution across the mine is modelled every month to ensure safe working target pressures are not exceeded. These networks and the evaluation procedure will be expanded into the West Field as the mine progresses.

Figure 21 Schematic hydrogeological section through the three Latrobe Valley mines



IPRH has initiated a depressurisation optimisation program to ensure a better balance between groundwater extraction rates and the prevention of mine floor heave. As part of this program, IPRH has been dumping overburden in the northeast corner of the mine since 1998. This has increased the weight over the aquifers, thereby increasing the allowable target aquifer pressure levels. As a consequence of improved knowledge and practices, the volume of water pumped from the aquifers at the mine has decreased allowing some recovery of aquifer groundwater levels in areas surrounding the mine. These practices will continue as mining of the West Field proceeds.

Groundwater is currently extracted at the rate of about 500 – 600 L/s (total, both aquifers –see Figure 10.18 in the EES), and is expected to be maintained at about this rate until near the end of the life of the West Field Mine when it will increase to about 800L/s as the final deep coal is extracted from the mine. (Note: 500 L/s equates to about 16 GL/year, i.e. 16 X 10^9 , and 800 L/s equates to about 25 GL/y). While these volumes are clearly significant, IPRH's modelling demonstrates that aquifer availability to other users should not be adversely affected. IPRH gives an undertaking that monitoring through the Regional Groundwater Committee will continue for the life of the project and should any authorised user of groundwater be adversely affected, it will compensate that user (a condition of IPRH's groundwater extraction licence).

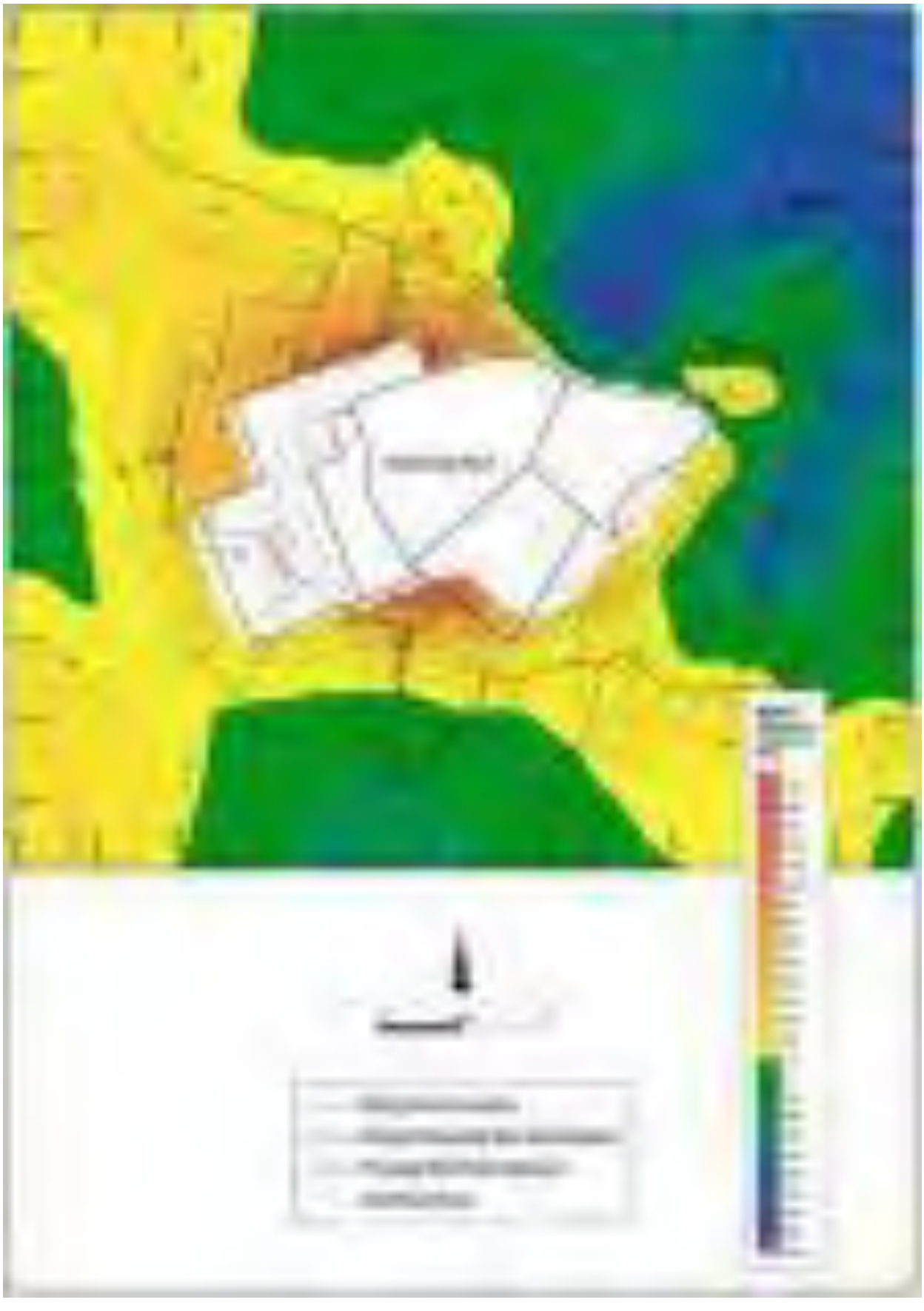
As a result of the draw down of the aquifer and the mining operation itself, there has been and will continue to be, substantial subsidence within the region. Subsidence due to development of the West Field has been predicted based on the net aquifer draw down in 2030 and is described in detail in Supporting Study 10 (GHD). Figure 22 shows the contours of subsidence due to brown coal extraction and aquifer depressurisation in the Latrobe Valley to 2000. The main subsidence due to the Hazelwood mine is adjacent to the northeast edge of the mine impacting on southwest Morwell.

Figure 22 Contours of subsidence in the Latrobe Valley in 2000

Figure 23 shows the anticipated relative difference (additional) in subsidence between 2000 and 2030 due to the West Field mine extension. The brown and yellow shaded areas show potential additional subsidence of up to about 1000 mm west of Morwell. The green and blue areas show areas of relative uplift or 'heave'. This includes much of the Morwell Township and the area east of the Hazelwood Power station. Anticipated subsidence along the MRD5 and the Strzelecki Highway deviation are up to 700 mm, a dimension anticipated in the design of the river and road. Allowance has been made in the design of the diversion levees to ensure adequate 'freeboard' is provided to meet the flood mitigation requirements (10,000-year ARI to protect the mine).

All major structures and infrastructure in the area have been assessed to ensure the structures are able to tolerate the ground movement and ground strains associated with development of the West Field Mine. All were found to be satisfactory with the possible exception of the MRD5 and the MRD5 Backwater levee bank. The possibility of tensile cracks appearing in the clay components of these earth-fill structures has been identified. A number of design options are available and will be fully assessed as detailed design takes place. Also, a detailed monitoring program will be put in place and monitored during the life of the project to ensure the required level of safety is maintained at all times.

Figure 23 Relative difference in subsidence between 2030 and 2000



14.2.4 CONCLUSIONS ON MINE STABILITY AND SUBSIDENCE

The Regional Groundwater Committee (RGC) plays a key role monitoring ground water extraction and subsidence and this should continue into the future. Clearly, it is essential that all coal extraction businesses should belong to this group and each should contribute its fair share to the costs of operating the group and its monitoring and modelling processes.

IPRH has demonstrated the advantages of the current process of monitoring the performance of the operation of aquifer depressurisation in order to achieve the dual goals of operational safety and minimisation of aquifer extraction. This program must continue in a similar manner until the coal extraction process and the rehabilitation of the mine are complete.

All major structures in the area of influence of major differentials in subsidence should be monitored on a regular basis during the life of the mine and during rehabilitation. The design of the MRD5 and the MRD backwater levee should be subjected to particular care to ensure anticipated ground movements can be handled. The performance of these structures should be reviewed on a more regular basis.

14.2.5 RECOMMENDATIONS ON MINE STABILITY AND SUBSIDENCE

The Panel recommends that the following matters be included in the Project Environmental Management Plan and that the drafting of the Mining Licence or Work Plan take them into account:

- **IPRH continue to develop its aquifer and subsidence monitoring program into the future until completion of the coal extraction process from the West Field Mine and the completion of the agreed rehabilitation program for the total Hazelwood Mine;**
- **IPRH monitor the structural integrity all major structures within the area of influence of major differential subsidence due to mine and depressurisation activities during the life of the mine and during the rehabilitation of the mine;**
- **the detailed design of the MRD5 and the MRD5 backwater levee be subjected to particular care and peer review to ensure stability in extreme subsidence situations.**

14.3 WATER USE

Specific questions relating to water use and potential impacts on water resources include:

- the potential effects of groundwater extraction on the Gippsland Lakes Ramsar wetlands;
- the effects of surface water use by IPRH on the Gippsland Lakes Ramsar wetlands;
- potential impacts on threatened or rare native fish species.

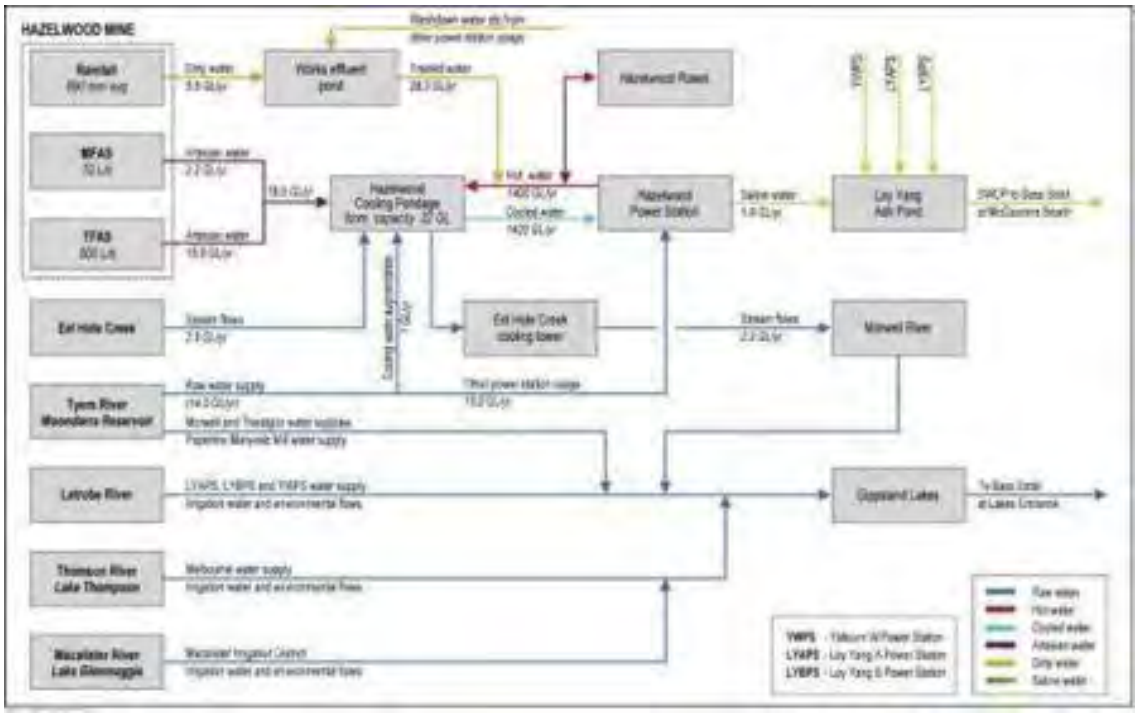
Although addressed in general terms in the EES, the main source of information, which summarises these issues, is the document *'Response to Department of the Environment and Heritage on request for reconsideration under Section 78 of EPBC Act'* prepared by Enesar for

IPRH. This report was referenced in IPRH's closing submission to the Panel on 13 August 2004 and copies were tabled at the 'Question and Answer' day on 27 August 2004. The report was prepared for DEH following a submission from EDO that these issues required consideration under Section 78 of the EPBC Act.

14.3.1 WATER BALANCE

Figure 24 (reproduced from the Enesar Report cited immediately above) is a simplified water balance diagram for the Hazelwood mine and power station showing water sources (inputs) and the Morwell River/Latrobe River/Gippsland Lakes system as it relates to Hazelwood. This figure demonstrates that in one year (2003 as sample) water inputs to the Hazelwood mine and power station operation include rainfall runoff (5.5 GL), aquifer (from depressurisation process, 18.0 GL in 2003), Eel Hole Creek inflow to the cooling pond (2.5 GL) and Tyers River (14.0 GL allocated from the Moondarra Reservoir), giving a total input of 40.0 GL/year. Water outputs include wastewater via the treatment system to Bass Straight and 2.3 GL returned to the Morwell River via the pondage overflow into Eel Hole Creek. The remainder of the water is lost to the atmosphere via the cooling pond system.

Figure 24 Water balance diagram



The volume of ground water extraction is discussed in section 14.2.3 above. Depending on the final mine rehabilitation model adopted for mine closure, ground water extraction will need to continue until the requisite counterweight is established over the mine floor. If groundwater is used in combination with fill material for this purpose, aquifer extraction will need to continue for 5-6 years at 20 - 25 GL/year until a volume of about 100 - 120 GL is contained within the open cut mine (refer to EES section 8.3).

The net effect is that about 14 GL/year of water that would have otherwise found its way into the Gippsland Lakes (via Tyers River into the Latrobe River) is used by IPRH, which equates to about 1% of the flow from the Latrobe River into the Gippsland Lakes. Flows in Eel Hole

Creek are maintained with about 2.5 GL into the cooling pond and about 2.3 GL out of the pond. Morwell River flows are not diverted for use into the mine/power station complex.

14.3.2 POTENTIAL IMPACT OF GROUND WATER EXTRACTION ON GIPPSLAND LAKES

A potential issue is the likelihood of the impact of reduced aquifer flows (as a result of extending the Hazelwood Mine) on the water levels and water quality of the Gippsland Lakes, a Ramsar site subject to the provisions of the EPBC Act.

Aquifer extraction for mine stability purposes in the Latrobe Valley has produced cones of depression in the Morwell Formation Aquifer System (MFAS) and the Traralgon Formation Aquifer System (TFAS) centred on the Hazelwood and Loy Yang Mines. This causes groundwater flows to be directed to these locations. The draw down decreases with distance from the mines and is only minor beyond Traralgon for the MFAS and Rosedale for the TFAS.

Lane Consulting, a hydrogeological consulting firm with considerable experience in the Gippsland coalfields, was engaged by IPRH to determine if there was an interconnection between the MFAS and the TFAS and the Gippsland Lakes and whether ground water extraction could affect water levels in the lakes. Anthony Lane presented to the Panel as an expert witness and his report was fully discussed.

Figure 25 (Figure 4 from the Lane consulting expert witness report IPRH#27) shows a simplified version of the very complex geological system between the Latrobe Valley mines (just beyond the extreme left of the figure) and Bass Straight beyond Lakes Entrance. Although Lane concedes there may be some minor interconnections between the MFAS and the TFAS, (see Figure 25) he concludes that:

> *"The degree of connection between the wetlands of the Gippsland Lakes and the Boisdale aquifer is less likely due to the significant thicknesses of clay in the upper Boisdale Formation between the lakes and the sandy aquifer units".*

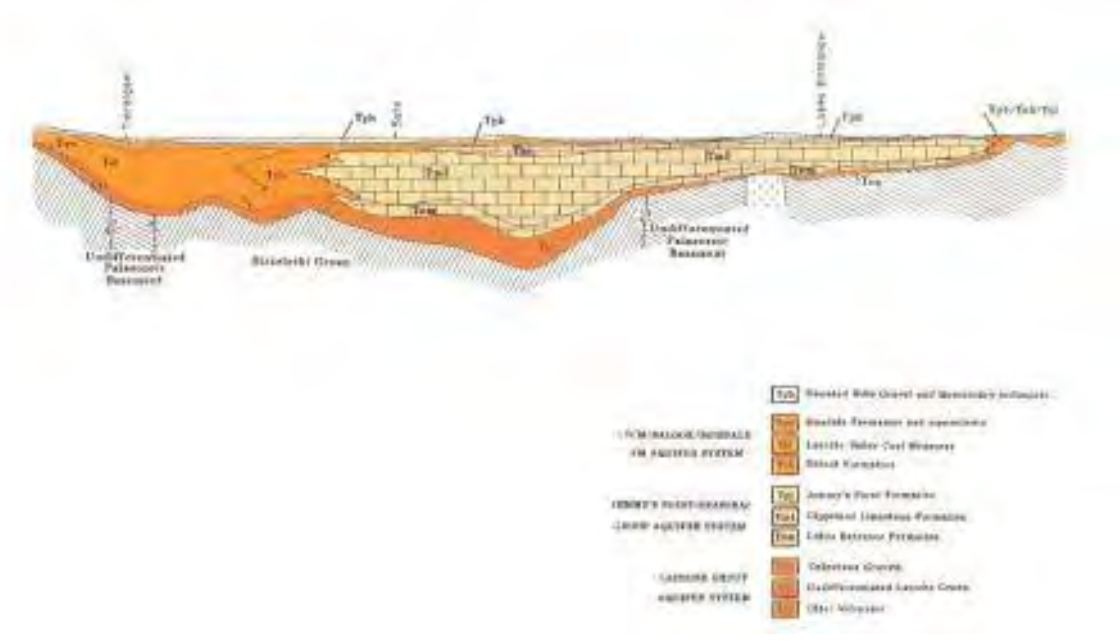
With regard to impacts of pumping on the Gippsland Lakes Ramsar wetland, Lane concludes:

> *"It is unlikely that there is any significant hydraulic connection between the most highly stressed aquifer, the deeper (400 m) TFAS and the sediments immediately underlying the Gippsland Lakes.*
>
> *The impact on groundwater levels in the upper MFAS does not extend to within 50 km of the Gippsland Lakes wetlands.*
>
> *The predicted decrease in groundwater pressure by 2030 (as opposed to water table level) in the TFAS at Kilmany (9 km east of Rosedale) is of the order of a few meters. However the combined effects of confining clay beds and the possible recharge boundary effect of the Balook Formation and the Nuntin Clay underlying the lakes would prevent any significant leakage of water downward from the Gippsland Lakes wetlands."*

It was further stated that depressurisation of these aquifers would not cause any measurable impact on water levels in the Ramsar wetlands of the Gippsland Lakes, a position reinforced by the CSIRO in the Gippsland Lakes Study (1999) where groundwater contributions to the lakes were considered insufficient to be included in the modelling of water flows.

The Panel asked Anthony Lane where the TFAS (the M2 or Trafalgar Aquifer) would discharge. He explained that any discharge would be well off-shore.

Figure 25 Hydrogeological Units – Gippsland Basin



14.3.3 CONCLUSIONS ON WATER USE

While ground water extraction is significant, there is only minimal (if any) impact on other users.

IPRH's Hazelwood operations have a minor impact on the Latrobe River system through the use of their allocation of 14 GL/year from the Tyers River.

The depressurisation of the aquifers at the Hazelwood mine would not cause any measurable impact on water inputs or levels in the Ramsar wetlands of the Gippsland Lakes.

15. AIR QUALITY AND HEALTH

15.1 DUST

15.1.1 OVERVIEW

Air quality and health was identified as one of the key issues prior to the preparation of the EES. Dust emissions from the construction of the road and river diversions together with the emissions from the mine were recognised as likely to have impacts on public health and amenity. Consequently the EES needed to address ways to minimise any short-term risk to people living, working or engaged in other activities near the construction works and the extension of the mining operations in the West Field.

The EES discusses air quality and health in section 11.2 and this information is described in more detail in Supporting Study 13.

Activities involved in the construction of the road and river diversions are expected to be the most significant sources of dust. These activities include the use of large truck and shovel equipment to shift soil and underlying material in an extensive cut and fill operation. The transport of large quantities of soil along haul roads is expected to be a major generator of dust as will the unloading of the transported material. Bulldozing operations and wind erosion from spoil mounds and other areas of disturbance will also contribute to the dust generation. However exhaust emissions from trucks, water carts, bulldozers, graders, excavators and compactors will contribute only a smallish amount of particulate matter.

Mining operations are also expected to contribute a minor amount of the overall dust burden, although even the dust from the present mining has given rise to some local complaints. The removal, transport and dumping of overburden by truck and shovel, which will occur from time to time during normal mining operations, will be a significant source of dust and in addition there will be dust generated from the actual coal mining operations.

The construction of the road and river diversions need to be undertaken over a period of some years with the operational periods limited to the drier times of the year – late spring, summer and autumn. Large equipment cannot safely or effectively operate when soil conditions are wet and these conditions prevail in the Latrobe Valley in winter and early spring. This situation is compounded by the existence of some very dispersive soils in the Latrobe Valley coalmine areas.

Intensive construction activities are planned to commence in early 2005 and will be completed in 2008, allowing one year for rehabilitation of the new river diversion before mining in the extended Phase 2 of West Field is planned to commence, in 2009. As explained earlier in this report, the construction activities of the road diversion will occur over an approximate length of 8 km. The Morwell river diversion will occur over a similar length plus additional work on two

tributaries. The effect of this elongated length of activity is that the generation of dust will not occur at one location but will move as the various phases of the construction are completed.

15.1.2 DUST MEASUREMENTS

Dust (particulate matter) does have the potential to impact on human health and this has been known for many decades. However man's ability to accurately measure and assess the various forms of dust has improved dramatically during the last two decades. As a result there are now several measures of dust that are used by health and environmental authorities for both health effects and amenity (nuisance dust). The indicators of dust used in the modelling and assessment of this proposed development were:

- **PM_{10}** – This is primarily a health indicator and is a measure of the respirable dust capable of being inhaled into the lungs. It is a measure of small particles that have an equivalent aerodynamic diameter up to and including 10 μm (or 1/100 of a millimetre).
- **$PM_{2.5}$** – This is also primarily a health indicator and is a measure of the respirable dust capable of being inhaled into the lungs and penetrating deep into the lungs and into the alveoli. It is a measure of very small particles that have an equivalent aerodynamic diameter up to 2.5 μm (or 1/400 of a millimetre).
- **TSP** – Total Suspended Particles. This is primarily an indicator of nuisance dust that can settle on surfaces. It is a measure of dust particles that includes larger particles and for the West Field project it has been assumed that they have an equivalent aerodynamic diameter up to about 75 μm (or up to about 1/13 of a millimetre).
- **Dust deposition** – This is also an indicator of nuisance dust that is measured in a dust gauge that is placed in the open air and which allows falling dust particles to enter the gauge by gravitation, typically over a period of 30 days or a month. Dust measurements are expressed as g/m^2/month (grams per square metre per month).

The instruments used to measure PM_{10}, $PM_{2.5}$ and TSP use a pump to induce a flow of air into the instrument. In the case of TSP measurements, the particles are trapped on a large filter paper while instruments used to measure PM_{10} and $PM_{2.5}$ use more sophisticated direct reading measuring procedures. The amounts of dust measured by these instruments are expresses as $\mu g/m^3$ (micrograms per cubic metre of air flowing through the instrument). A μg (microgram) is a very small amount of material and is equal to 1 millionth of a gram.

Previous sampling of dust particles at the Hazelwood mine area indicated that PM_{10} sized particles constituted 58% of the TSP measurements. This is an important relationship as many air quality measurements are of TSP rather than made using the more recent and sophisticated instruments used to measure PM_{10} and $PM_{2.5}$.

Another relationship derived from previous sampling at the Hazelwood mine area that was used in the air quality assessments was that the ratio between $PM_{2.5}$ particles and PM_{10} particles was 0.374. That is $PM_{2.5}$ particles constituted 37% of the PM_{10} measurements. This relationship was used in modelling where the PM_{10} dust levels were modelled and enabled the $PM_{2.5}$ dust levels to be scaled from the PM_{10} dust levels.

Using the above two percentages, the concentration of PM_{10} and $PM_{2.5}$ particles could be estimated if TSP particle concentrations are known.

15.1.3 AIR QUALITY STANDARDS

The EPA uses various standards for measuring air quality and these are promulgated in two State Environment Protection Policies (SEPP) and in particular in the SEPP (Air Quality Management) 2001. The standards, which are of particular relevance to the West Field development, are set out in EPA's submission (page 31 of Submission 533L) where the approach to be adopted is to compare predicted ground level concentrations for PM_{10} and $PM_{2.5}$ to the intervention levels specified in Schedule B of the SEPP AQM at the nearest receptor, as follows:

- 24-hour average for PM_{10} of 60 $\mu g/m^3$
- 24-hour average for $PM_{2.5}$ of 36 $\mu g/m^3$

An intervention level is defined in the SEPP (Air Quality Management) as *"….a numerical value for an indicator which if exceeded may trigger development of a neighbourhood environment improvement plan."* In effect, the above-mentioned intervention levels can be used as air quality standards that should not be exceeded and should certainly not be exceeded frequently or on a regular basis.

In addition, the EPA in discussion with the proponent, has agreed a "project standard" for TSP of:

- 24-hour average for TSP of 120 $\mu g/m^3$.

The proponent has also used a standard for dust deposition derived from earlier work by the NSW SPCC [later became the NSW EPA and is now part of the Department of Environment and Conservation (NSW)]. The relevant parts of this standard for the West Field project are:

- Maximum increase of 2 g/m^2/month for dust deposition for a residential location if the existing level of dust is 1 g/m^2/month.
- Maximum increase of 1 g/m^2/month for dust deposition for a residential location if the existing level of dust is 2 g/m^2/month.

A further standard that is of relevance to the West Field project is a National Environment Protection Measure (NEPM) for ambient air quality that has been incorporated into the SEPP (Ambient Air Quality) 1999:

- 24-hour average for PM_{10} of 50 $\mu g/m^3$ with a maximum number of 5 exceedances per year as an air quality standard in a residential area such as a town, eg Morwell.

15.1.4 MODELLING OF AIR QUALITY

Modelling of air quality has been undertaken to predict the likely impacts on air quality due to the activities of the road and river diversions and the extension of the West Field mine. The results of the modelling were compared with the standards for the project as outlined above and this is discussed later in this report.

The Panel was made aware that the proposed air quality modelling was the subject of a series of discussions with the EPA. The proponent's modelling expert submitted information about the proposed modelling to the EPA early in the EES process. The Panel finds this early co-operative approach to modelling of the project to be a very sensible and it probably reduced the potential for major disagreements between the proponent and the EPA about the modelling methodology.

The proponent's consultant has used the Ausplume (version 5.4) mathematical model to predict the dispersion of dust concentrations at various locations surrounding the West Field project activities. This involved computer calculated data for locations on a 250 m grid around the activities. The modelling also included calculated data at 5 individual residences that were the closest residences to the activities and at 5 other specific locations within the Morwell Township.

The modelling used a range of inputs, including 12 months of detailed meteorological data (1996 data from Thoms Bridge meteorological station was used as representing a typical year) and daily varying background actual measurements of levels of dust in 1996. Further details of inputs are presented in the Supporting Study document.

The proponent selected five scenario years to model dust. These years were selected as being the ones that are representative of the various stages of development of the project and are the years when the highest levels of dust impacts are likely to occur. These scenarios are described in the EES in the following manner:

- **Scenario 1 – Construction Year 1: January to May 2005.** This scenario represents the January 2005 start of construction for stream and road works. It includes initial excavation of the Fifth Morwell River Diversion near Marretts and Golden Gully roads, with haulage of the spoil to construct the new formation of the relocated Strzelecki Highway;
- **Scenario 2 – Construction Year 2: November 2005 to May 2006.** This scenario represents the second year of the stream and road construction works and includes major excavation works of the river diversion channel between Marretts Road and Golden Gully Road, and haulage of the material to spoil mounds 1, 2 and 3 between the new river course and the mine;
- **Scenario 3 – Construction Year 3: November 2006 to May 2007.** This scenario represents the third year of the stream and road construction works and includes major excavation works of the river diversion south of Golden Gully Road and haulage of the material to spoil mounds 4 and 5;
- **Scenario 4 – Operations Year 2012.** This scenario represents normal mining operations in the West Field and truck-and-shovel overburden removal from northwest of Block 2B and the Office Field. The truck-and-shovel activities at Block 2B will take place from 2009 to 2012/2013, with Operation Year 2012 representing the worst-case conditions (closest proximity to Morwell).
- **Scenario 5 – Operations Year 2028.** This scenario represents normal mining in the West Field late in the project when the operations are closest to residences to the west.

Of particular importance were the inputs to the modelling of the various sources of dust estimated to arise from the construction and mine operating activities. The road and river diversions were important causes of dust in the first three scenarios. The overburden removal was a major cause of dust in the 4th scenario while normal mining operations were the expected causes of dust in the 5th scenario. The major sources of dust with their estimated emission rates in kilograms per hour for each of the 5 scenarios is summarised in the Table 19 below. The data in Table 19 below has been extracted from Tables 4.1 to 4.5 in the Supporting Study 13 (The notes below the Table have been provided by the Panel).

Table 19 Sources and rates of dust emissions

	PM_{10} Emissions kg/hr				
Activity	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**
Loading	14.1	15.8	12.6	10.0	
Haul roads [1]	73.3	39.5	32.7	60.7	
Unloading	28.2	31.5	25.0	20.1	
Wind erosion [2]	48.1	39.8	36.2	38.7	31.7
Other	22.6	20.9	20.9	20.6	12.2
Exhaust emissions [3]	7.3	5.1	5.1	6.8	
Total	**193.6**	**152.6**	**132.5**	**156.9**	**43.9**

1. – It has been assumed that haul roads will be watered to reduce dust emissions. Compared to no watering of the haul roads, the reduction in dust is assessed as 75%.

2. – The dust emissions due to wind, e.g. from spoil mounds, excavated areas, etc. appear to be high. However a wind speed of 5.4 m/sec is the critical wind speed for lift-off and the meteorological data shows that this speed is only exceeded for about 28% of the time. Consequently, dust emissions due to wind erosion are expected to be of a second order of magnitude compared to the other sources, especially haul roads. The wind speed for the generation of dust emissions for all the other sources is assumed to be effective down to 0.5 m/sec.

3. – Exhaust emissions are from combustion of hydrocarbon fuels and are quite different in nature to the emissions from soil and overburden activities, which are mineral based emissions.

Despite the use of watering to reduce dust generation, the haul roads are the most dominant source of dust. As explained in note 2 below the above table, wind erosion appears to be a major source of dust but in reality this is not the case because a relatively high wind speed needed to instigate the lift off of the dust.

Initial modelling undertaken by the proponent's consultant showed that there would be an unacceptable number of days of exceedances of the air quality standards. The exceedances were likely to be substantial and frequent. As a result of these predictions, the proponent made a number of changes to the proposed operations of the project. The principal changes were to increase the size of the trucks from a capacity of 50 tonnes to 60 tonnes thus reducing the number of trips along the haul roads; extending the construction season from January to April to January to May; and limiting the operating hours to reduce the likelihood of encountering adverse weather conditions for dispersion of dust (light winds, limited mixing height).

Modelling of PM_{10}, TSP and dust deposition was performed with the $PM_{2.5}$ modelling being derived from the PM_{10} modelling results using the relationship between $PM_{2.5}$/ PM_{10} measurements of 0.374. Details of the modelling are included in Supporting Study 13.

One important question put to Dr Ross (the proponent's expert witness) by the Panel was whether the modelling undertaken was realistic or conservative. Dr Ross unhesitatingly stated that it was "strongly conservative" and he went on to explain that there were a number of reasons for this. One factor was that the modelling only considered dry deposition and no account was taken of when the spoil material might be wet due to rain. Damp or wet conditions would obviously reduce dust emissions. Another important factor was that the model uses wind speeds as low as 0.5 m/sec whereas other similar models only use wind

speeds down to 1 m/sec. This means that the modelling includes calmer wind conditions and therefore will include dust emissions that would not be included in other models. Furthermore Dr Ross considered that the emission factors used as the basis for calculating the rates of dust emissions were quite conservative.

15.1.5 MODELLING RESULTS

The results of the modelling are presented in Supporting Study 13 and include contour plots of ground level concentrations of $PM_{10;}$ time series plots of ground level concentrations of both PM_{10} and TSP and various tables of data. A separate table provides the results of the modelling of dust deposition. The time series plots highlight the modelling predictions at residences to the west of the activities and one residence to the northeast.

Overall, the modelling results indicate that the occurrence of dust problems is likely to be relatively limited in terms of the number of days when air quality is likely to be seriously affected by dust. This only applied to the modelling of PM_{10} dust where exceedances were predicted in the first 4 scenarios at one or more of the sensitive receptor sites (residences). The maximum number of exceedances at any sensitive receptor site in any scenario year was 7 days in scenario year 2 and another site was predicted to experience 6 days of exceedances in scenario year 3.

The modelling of $PM_{2.5}$ suggests that the requirements of a 24-hour average for $PM_{2.5}$ of not exceeding 36 $\mu g/m^3$ at all sensitive locations in all scenario years will be met. Similarly the modelling of TSP indicates that the levels of dust are unlikely to be a source of nuisance and that the standard of 24-hour average of not exceeding 120 $\mu g/m^3$ will also be met at all sensitive locations in all scenario years. The results of the modelling of dust deposition are well within the limits set for this measure of nuisance dust for the project.

The modelling shows that all 5 sites in the Morwell township used as locations where the NEPM standard of 24-hour average for PM_{10} of 50 $\mu g/m^3$ with a maximum number of 5 exceedances per year should apply, are expected to meet the requirement in all scenario years. It should be noted that some of the rural sites closest to the mine (e.g. DP16) are predicted to exceed the NEPM standard, though these sites do not meet the NEPM specification for monitoring sites in that they do not represent the regional or sub-regional population.

However the Panel notes that there are a number of days when air quality in terms of 24-hour averaged PM_{10} is likely to be compromised at the residences that are closest to the construction activities for the road and river diversions. Some of these residences are likely to encounter levels of PM_{10} that will significantly exceed the intervention level and a number of exceedances are predicted to occur during each of the three years of the construction program. In addition, one residence is likely to be impacted by exceedances from mining during 2012.

However a more detailed analysis of some of these exceedances provided by Dr Ross illustrated that they typically exist for a relatively short period of time. The examples provided showed very high dust levels for an hour or two in the early morning or early evening and these highly elevated levels were sufficient for the location to exceed the PM_{10} of 60 $\mu g/m^3$ intervention level when averaged over 24 hours.

Table 20 is reproduced from the EES where it appeared as Table 11.2 in the Main Report.

Table 20 Predicted highest and sixth-highest levels of PM10 and TSP, and increments in dust deposition for Scenarios 1 to 5

Table 11.2 Predicted highest and sixth-highest levels of PM_{10} and TSP, and increments in dust deposition for Scenarios 1 to 5

Receptor	PM_{10} (µg/m³)			TSP (µg/m³)			
	Predicted Highest Level	Predicted Sixth-Highest Level*	Predicted No. of Exceedences of 60 µg/m³†	Predicted Highest Level	Predicted Sixth-Highest Level	Predicted No. of Exceedences of 120 µg/m³**	Dust Deposition (g/m²/month)‡‡
Scenario 1							
DP1	60.2	43.0	1	87.8	65.5	0	The predicted increment of less than 0.1 g/m²/month plus the background level of 1 g/m²/month make a predicted total dust deposition at each receptor in each scenario of less than 1.1 g/m²/month.
DP4	70.3	49.8	3	96.9	68.5	0	
DP13	61.6	42.2	1	95.5	65.3	0	
DP14	59.9	39.9	0	93.1	63.5	0	
DP16	60.9	39.1	1	95.2	63.8	0	
Scenario 2							
DP1	50.2	41.2	0	86.2	63.3	0	
DP4	94.0	64.8	7	98.7	68.8	0	
DP13	58.9	43.3	0	93.8	64.1	0	
DP14	56.8	38.9	0	91.5	63.3	0	
DP16	59.0	40.3	0	91.6	65.8	0	
Scenario 3							
DP1	49.7	40.2	0	84.8	63.4	0	
DP4	81.7	55.7	4	104.0	72.5	0	**$PM_{2.5}$ (µg/m³)**
DP13	77.8	48.4	3	101.2	67.5	0	
DP14	70.9	43.7	2	90.9	66.9	0	
DP16	90.8	61.2	6	96.5	73.6	0	
Scenario 4							
DP1	62.9	49.9	1	92.3	66.6	0	$PM_{2.5}$ results scaled by the empirically determined $PM_{2.5}/PM_{10}$ ratio of 0.374 indicate that the intervention level of 36 µg/m3 is satisfied for $PM_{2.5}$ at all receptors under all scenarios.
DP4	57.8	41.0	0	89.6	65.3	0	
DP13	55.3	43.4	0	85.9	64.8	0	
DP14	54.6	43.4	0	85.1	63.5	0	
DP16	61.0	38.9	1	92.2	63.2	0	
Scenario 5							
DP1	49.0	36.9	0	84.1	62.5	0	
DP4	56.3	37.6	0	87.8	62.4	0	
DP13	50.0	39.5	0	89.2	63.2	0	
DP14	50.1	38.3	0	85.3	62.8	0	
DP16	51.4	38.3	0	88.7	63.4	0	

*PM_{10} Project Limits for the Fourth Morwell River Diversion: NEPM for Ambient Air Quality and the SEPP (Ambient Air Quality) of 50 µg/m³ (24-hour average) with a maximum of five exceedence-days per year. † SEPP (Air Quality Management): 24-hour average PM_{10} intervention level of 60 µg/m³. **Project Standard for TSP for Douglas Heavy Minerals Project by the EPA. ‡‡NSW EPA amenity criteria for deposition of dust. With an existing dust deposition level of 1 g/m²/month, the maximum acceptable increase over existing levels would be 2 g/m²/month for residential locations and other locations.

Two examples of the occurrence of this short duration but very high dust levels are shown in the Figures 26 and 27. These figures are from Appendix 7 of the Supporting Study 13.

Figure 26 Hourly average PM_{10} Predictions – Scenario 1

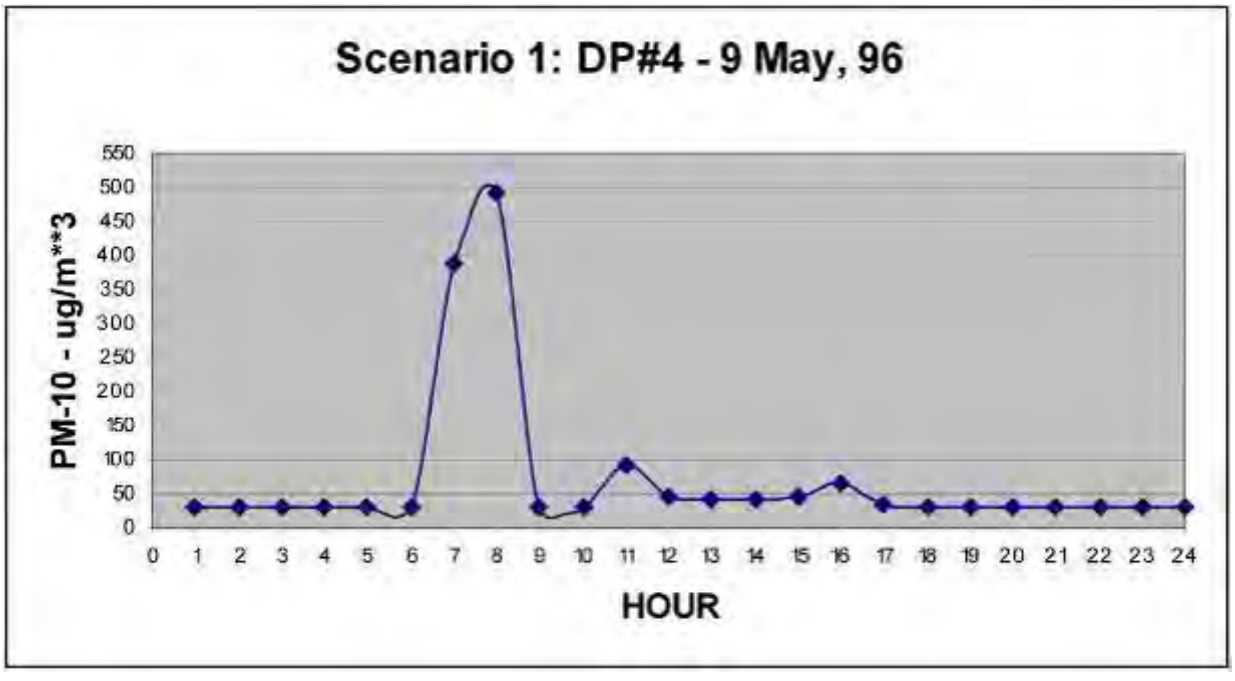
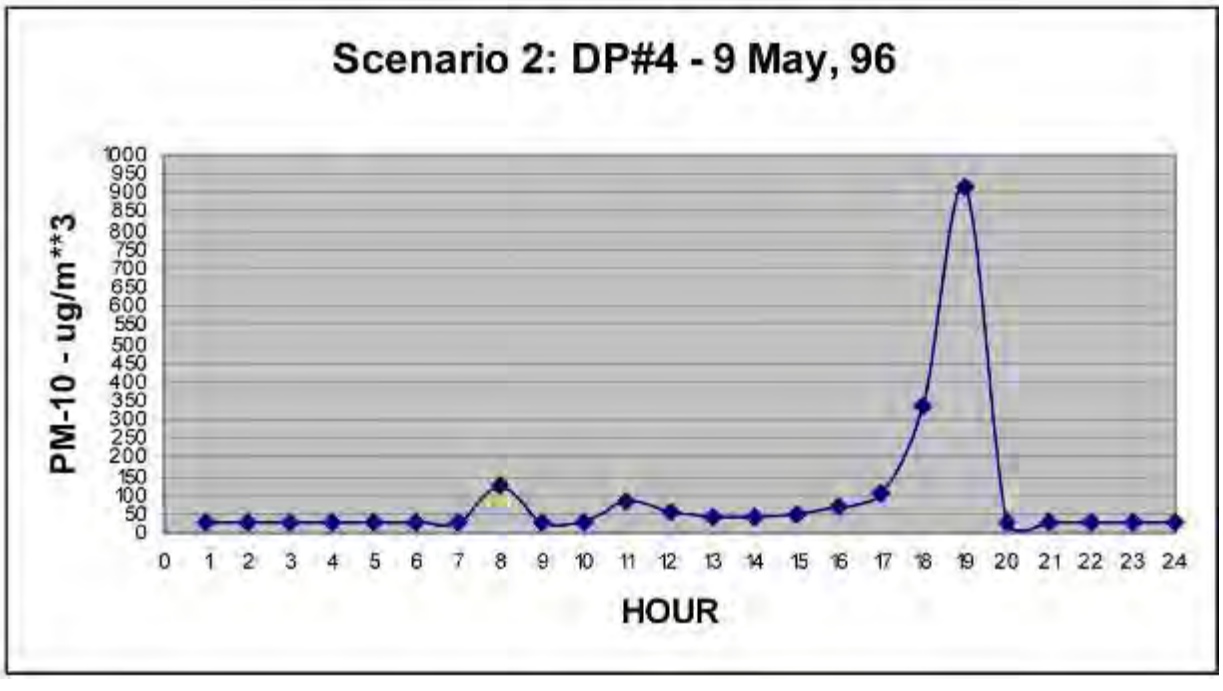


Figure 27 Hourly average PM_{10} Predictions – Scenario 2



The first figure shows very high dust levels were predicted to occur around the 7 am to 8 am period but by 9 am the dust levels were predicted to have reduced to very low levels. In the second figure, extremely high dust levels were predicted to occur around 6 pm to 7 pm with very low levels before and after that time.

An explanation for the occurrence of these exceedances was provided by an analysis of the meteorology during these events. These very high levels of dust were associated with the

occurrence of very low wind speeds, eg 0.5m/sec, and very stable atmospheric conditions, eg stability category 6. These conditions are most likely to occur in the early morning or early evening and especially in late autumn. The effect of these adverse meteorological conditions is a lack of dispersion of dust, thus allowing a build up of the concentration of dust in the atmosphere.

From a practical management perspective, these periods of very high levels of dust need to be predicted and action taken to reduce the potential for the generation of dust during such periods. In the extreme case, work on moving spoil might need to cease until the meteorological conditions change, eg increased wind speed and increased atmospheric instability, thus providing conditions for the greater dispersion of dust.

The EPA in its submission recognised that the "normal" dust control conditions (use of water sprays, especially on haul roads) does not represent best practice and would seek to have a higher level of dust prevention. The EPA acknowledged that while the use of greater quantities of water would help to suppress dust emissions to a greater extent, this was unlikely to be acceptable because excess use of water would produce unacceptably wet on-site working conditions. It sought the use of other methods for dust suppression such as the use of chemical stabilisers on haul roads.

During the presentation by RTL on the practicability of implementing the proposed Morwell River Diversion 6, the Panel took the opportunity to ask RTL about the use of chemical stabilisers and other mechanisms to prevent dust emissions. The RTL representatives were very clear in expressing their experiences with these 'superior' methods of dust suppression. Their response was that basically these materials and methods worked for a limited time only and were expensive. The Panel has noted the very real practical experience of RTL in the Latrobe Valley and accepts that using water to the greatest extent possible without compromising work safety was probably the best method of controlling dust. The practical experience in the Latrobe Valley would indicate that using water to suppress dust plus effective management of activities that generate dust actually does represent best practice.

15.1.6 MANAGEMENT AND MONITORING OF DUST EMISSIONS

Since modelling is not an exact science but is a predictor of what might occur, there is obviously some uncertainty about the predictions. Because of this uncertainty there is a clear need for some real-time monitoring of PM_{10} levels. This particularly applies to the three years of the construction of the road and river diversions because most of the days of exceedance of the PM_{10} standard were predicted to occur during this time period.

IPRH has acknowledged the need for real-time monitoring and intends using this type of monitoring to provide feedback to the management of the construction activities. If the monitored PM_{10} levels indicate that the 60 $\mu g/m^3$ intervention level is likely to be exceeded at one or more of the residences, action needs to be taken to reduce the dust levels generated by the construction activities.

The actions that might be taken to manage the dust emissions are discussed in the EES on pages 11-13 and 11-14 and include:

- a combination of real-time monitoring against trigger levels with forecasts of ambient dust at the residences closest to construction works;

- the use of dust monitoring gauges at specified residences during the three years of the construction phase;
- the provision of information to local residents about the nature and schedule of construction activities and the provision of points of contact for nearby residents;
- relocating or rescheduling works with the highest dust generating potential away from sensitive receptors;
- increasing use of dust suppression measures;
- short-term stoppage of construction works until adverse meteorological conditions have passed.

The practical information provided by Mr Johnson from RTL about construction activities involving soil and overburden was especially useful to the Panel. On the basis of this information the Panel is very doubtful that there is much scope for increasing dust suppression measures other than the greater use of watering, within the limits necessitated by considerations of safety.

In its submission, the EPA made the following comments about monitoring of dust:

> *"EPA strongly supports real time continuous monitoring of PM_{10} and the reactive management strategy being proposed by International Power for this site.*
>
> *EPA recommends that the final detail of the monitoring plan and reactive management strategy be developed in consultation with the ERC with input from the local community."*

15.1.7 PANEL COMMENTS

The Panel appreciates how the ratio between $PM_{2.5}$ particles and PM_{10} particles of 0.374 was determined and why the proponent considers that the derivation of the ratio is considered valid. However the Panel observed that the set of data from which this ratio of 0.374 was derived was quite small – 7 dust samples taken when the wind was classed as blowing from the direction of the mine. These samples were compared to 16 dust samples that were classed as occurring when the wind was blowing from directions other than the mine and therefore these samples could be taken as a measure of the background dust. The ratio for these 16 samples was 0.610. There were another 4 samples that could not be considered to be either from the direction of the mine or from a direction completely away from the direction of the mine. If the results of all 27 dust samples are pooled, the ratio is 0.527.

The Panel is concerned that the ratio of 0.374 is not convincingly established. It would therefore have been prudent to evaluate the effect of using the pooled ratio of 0.527 as a test of sensitivity for the evaluation of the modelling of $PM_{2.5}$ particles.

The Panel agrees with the EPA with respect to the proposed real-time monitoring and planned management strategy and is of the view that the dust emissions from the project can be effectively managed. The Panel also commends the intention of IPRH to further discuss these proposals with the EPA.

The Panel wishes to ensure that the planned real-time monitoring of dust be used to validate the air quality modelling. The Panel also recommends that the validation be used and to develop a forecasting technique that identifies meteorological conditions that are likely lead to exceedances at sensitive receptor sites of the PM_{10} level of 60 $\mu g/m^3$ for a 24-hour averaging period.

15.1.8 CONCLUSIONS ON DUST

The modelling of dust has been based on discussions with the EPA to ensure that the modelling would meet the EPA's expectations in terms of methodology and comparison with a number of standards of air quality. The modelling may have over-predicted the occurrence of exceedances and their levels of dust because of the conservative nature of some of the inputs to the modelling. The use of four measures of dust - PM_{10}, $PM_{2.5}$, TSP and dust deposits - provides sufficient information on which to assess the likely impacts of dust. The modelling results showed that PM_{10} was the only measure of dust where exceedances of the standard were predicted.

Never the less, the results show that dust is a potential problem at some residences relatively close to the construction activities in some years. Although the number of predicted exceedances of the PM_{10} intervention level is not high, these occurrences demonstrate the need for an effective dust control strategy. Evidence has been presented that shows that the dust problems can be suitably managed to ensure that dust does not have a serious impact on neighbouring properties. Exceedances are far less likely to occur from mining in the years after the construction activities. The most likely years in which exceedances may occur are those when the mine is closest to the neighbouring properties and overburden removal is a major activity.

15.1.9 RECOMMENDATIONS ON DUST

The Panel recommends that:

- **the spraying of water be the primary control mechanism for the suppression of dust emissions from haul roads;**
- **real-time continuous monitoring of PM_{10} dust be implemented as an integral part of the dust control strategy, using at least two monitors at dust sensitive locations that are close to the construction activities in each construction season;**
- **a suitable meteorological station be identified or installed to provide reliable weather data for use in the dust control strategy;**
- **the data from the real-time monitoring of PM_{10} dust and from the meteorological station be used to validate the model predictions of dust and to improve the forecasting technique of conditions that are likely to produce exceedances of the dust criteria at sensitive receptor sites;**
- **trigger values of PM_{10} dust and other reliable predictors of exceedances such as meteorological conditions be determined by IPRH, in consultation with EPA, and incorporated into the dust control strategy;**
- **the air quality performance criteria in the PEMP be expanded to include non-exceedance of the 60 $\mu g/m^3$ PM_{10} 24-hour average level, non-exceedance of the 36 $\mu g/m^3$ $PM_{2.5}$ 24-hour average level, and correction of the allowable number of exceedances associated with the NEPM standard of 50 $\mu g/m^3$ for the annual average of the 24 -hour average PM_{10} levels, which should be 5, not 6.**

15.2 HEALTH IMPLICATIONS OF SILICA

Very fine dust particles are associated with health risks, especially for people with a compromised lung function. Asthmatics may also suffer an exacerbation of their condition due to elevated dust levels. Because of these risks, health and environmental authorities have established the air quality parameters of PM_{10} and $PM_{2.5}$ as discussed above.

Of greater health concern is the potential for some forms of dust particles to cause specific and serious health effects. With the occurrence of excessive dust concentrations there is the recognised potential for silica (SiO_2) to cause diseases such as silicosis and lung cancer. This concern has been addressed in the EES - refer section 11.2 - and is considered in greater detail in Supporting Study 14.

The Supporting Study states that: *"Although there is evidence that the risk of lung cancer in silica exposed people is associated primarily with individuals who have established silicosis, it is not certain that silicosis is a necessary precursor for the development of lung cancer."* Consequently separate risk assessments were prepared for the two diseases of silicosis and lung cancer due to silica exposure.

The risk assessments conducted were public health risks associated with the estimated exposures to the silica content of dust arising from the construction and mining activities of the proposed development. It should be appreciated that the protection of public health requires lower exposures to pollutants than exposures that are considered safe for a working environment. The reason for the difference between these two types of assessments is primarily due to the 'healthy worker effect', which reflects the generally better health of people in the workplace compared to the health of the general public. A significant proportion of the general public already have their health compromised. This may be due to age, e.g. the very young or the very old, as well as to the wide variation in the health status that typically exists in the community.

As a consequence, the standards for the protection of public health are aimed at protecting these more vulnerable members of the general public. As a result the public health standards are more stringent than the standards for people in the workforce. The PM_{10} and $PM_{2.5}$ standards used to assess the effects of dust mentioned in the section dealing with air quality are based on the protection of public health. Separate workplace standards exist for the protection of workers from the effects of dust, including specific dusts such as those containing a proportion of silica.

Studies of workplace health form a large proportion of the scientific data on health effects and are used to derive the workplace standards. It is quite common for these workplace standards to be used to derive the counterpart public health standards. In many cases a safety factor of 10 to 30 is applied to the workplace standards to derive the public health standard. That is, the public health standards are frequently $1/10^{th}$ to $1/30^{th}$ of the standard for the workplace.

15.2.1 SILICA EXPOSURES

A detailed description of the degree of penetration by very small particles such as PM_{10} and $PM_{2.5}$ into the lung tissue is given in the Supporting Study and there is no intention to replicate that description here. Similarly there is no intention to describe the impacts of these particles on the lung tissues. The important principle is that very fine particles are able to penetrate deep into the lungs, including the alveoli, and this leads to health concerns due to the nature of these fine particles.

Silica is a very common component of dusts due to its widespread occurrence in many minerals in rocks and their subsequent breakdown through weathering to form soils. It is well established that crystalline silica in sufficient concentrations in dust is a health hazard. In particular, crystalline silica is associated with the occurrence of lung cancer and of the more specific silica induced disease of silicosis.

Because of these potential health effects, IPRH instigated an assessment of the levels of silica in dust in air samples around the Hazelwood mine. The results of these measurements are given in Appendix 4 of Supporting Study 12 and are summarised in the Table 21 below.

Table 21 Average $PM_{2.5}$ and average silica percentages

Average $PM_{2.5}$ in air samples and average percentage silica in $PM_{2.5}$ dust in air samples					
Site 1 – south of mine 7 samples	Site 2 – south west of mine 8 samples	Site 4 – north east of mine 8 samples	Wind from direction of mine 6 samples	Background wind (direction not stated)	Wind direction uncertain 8 samples
12.0 µg/m^3	4.7 µg/m^3	8.8 µg/m^3	7.1 µg/m^3	4.5 µg/m^3	13.7 µg/m^3
5.8%	1.5%	2.7%	2.9%	1.7%	5.2%
Average of 23 samples = 3.2%			Average of 23 samples = 3.2%		

The above data has been used as part of the input to an assessment of the exposure of the general public to silica. Another input to the assessment process was the highest annual average dust level predicted by the modelling. This occurred at one of the residences, which was located to the north east of the mine during the 2012 operations year (scenario 4). The annual average predicted PM_{10} was 20 µg/m^3, which including an estimated background dust component of 13 µg/m^3.

Using the above data inputs, the calculated annual average silica content in $PM_{2.5}$ dust is 0.21 µg/m^3 (see Table 32, in Supporting Study 14 by Toxikos Pty Ltd). In essence, the health risk assessments involved comparing this level of exposure to silica (assumed to be crystalline silica) against various health standards for silica.

15.2.2 LUNG CANCER RISKS

Supporting Study 14, Health Risk Assessment of Crystalline Silica at the Hazelwood Mine West Field Extension, prepared by Dr Roger Drew of Toxikos Pty Ltd, stated that the International Agency for Research on Cancer concluded in 1997 that crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans.

The risk assessment carried out for IPRH by Dr Drew for exposure to silica as a cause of lung cancer, involves the derivation of a target level of silica that is estimated to result in approximately one extra cancer per 100,000 of the general population. This level was calculated to be an annual average concentration of silica in $PM_{2.5}$ of 4.6 µg/m^3 (over 40 years of continuous exposure). For more details of the assessment procedure, the reader is referred to pages 15 – 17 of Supporting Study 14.

The assessment compared the predicted annual average concentration of silica in $PM_{2.5}$ dust of 0.21 µg/m^3 with the standard of silica in $PM_{2.5}$ of 4.6 µg/m^3. The predicted concentration of silica is approximately 22 times less than the concentration estimated to be associated with a 1 in 100,000 excess risk of lung cancer for the general public.

The risk assessment emphasises that the results are conservative, i.e. they over estimate the risk, for a number of reasons:

- it has been assumed that the silica in the overburden and coal is biologically equivalent to 'fresh' crystalline silica. In fact the silica is weathered silica, which has far less potency in causing health problems in lung tissue than crystalline silica. The weathered silica in the Latrobe Valley is derived from the erosion of the minerals in the rocks of the Haunted Hills Formation and this material was deposited over many millennia. It is not 'fresh' crystalline silica;
- it has been assumed that there will be 40 years of continuous exposure to dust as predicted for the 'worst case' scenario that occurred in 2012. This was the year when mining was closest to the residence that was predicted to be the most impacted during the West Field project. The reality is that the mining activities will move as the mine progresses. The mining is expected to move towards the residence and be at its closest in 2012 and then will move away from the residence after 2012;
- the 40 years of continuous exposure will not actually occur as predicted because the life of the mining activities is expected to be around 25 years;
- the modelling used as an input to the risk assessment is conservative as explained above in the discussion of the air quality modelling predictions. In particular, the modelling assumes that dust emissions remain suspended without any settling due to gravity. Also, there is no account taken of the wetness of the materials to be shifted or mined, which will reduce the generation of dust.

The lung cancer risk assessment concludes that *"…. there is negligible carcinogenic risk associated with the silica content of predicted dust levels that may arise from the west Field Project."*

15.2.3 SILICOSIS RISKS

The risk assessment for silicosis was evaluated in two ways. The first used a USA Environment Protection Agency estimation of the risk of silicosis and the second uses a draft Californian Environment Protection Agency estimation of risk. For the details of the silicosis risk assessment, the reader is referred to pages 18 to 20 of Supporting Study 14.

The USA EPA estimation uses a lifetime exposure to crystalline silica of 0.6 to 1 mg/m^3 as being close to a 0% risk of silicosis for the general public. This is a total exposure over 70 years, during which the exposure can vary from year to year, but if the accumulated exposure is less than 0.6 mg/m^3 to 1 mg/m^3 (600 µg/m^3 to 1,000 µg/m^3) the risk of developing silicosis is about zero.

The risk assessment performed for IPRH was carried out using two assumptions:

- 40 years of exposure to the mine and background silica followed by 30 years of exposure to the background silica only;
- 25 years of exposure to the mine and background silica followed by 45 years of exposure to the background silica only.

For the first case, the accumulated silica was calculated to be 12.3 µg/m^3. This is approximately 50 times less than the 600 µg/m^3 cumulative dose and has an even greater safety margin if the comparison is made with the 1,000 µg/m^3 cumulative dose.

For the second case, the accumulated silica was calculated to be 11.1 µg/m^3. This is approximately 54 times less than the 600 µg/m^3 cumulative dose.

This silicosis risk assessment concludes that *"…. There is negligible risk of silicosis associated with the silica content of predicted dust levels associated with the West Field Project."*

The Californian EPA has proposed a chronic exposure level for non-carcinogenic effects, i.e. silicosis, of 3 µg/m^3 measured as PM_{10}. This is a dose to which an individual member of the general public could be continually exposed to without significant risk of harm.

Because there are no measurements available of the % silica in PM_{10} – the % silica measurements were made on the $PM_{2.5}$ dust – the risk assessment assumed that the silica content would be the same as in $PM_{2.5}$. (This is likely to be an underestimation of the % silica as some silica would be in dust particles larger than $PM_{2.5}$ dust.) This resulted in a calculated concentration of silica in air of 0.42 µg/m^3, which includes the dust from the mine (0.20 µg/m^3) and the background dust (0.22 µg/m^3).

The assessment states that the 0.42 µg/m^3 level of exposure (assumed to be continuous) is about 7 times less than the level proposed by the Californian EPA. Again the assessment emphasises that the results are conservative. In particular the assumption of 70 years exposure to the silica from the mine and from background sources overestimates the risk as the mining activities are expected to last for 25 years. This factor is considered to more than compensate for the likely under estimate of the silica % in PM_{10}.

The same conservative factors that were listed as applying to the lung cancer risk assessment also apply to the silicosis risk assessment.

This second silicosis risk assessment concludes that "…. The risk of silicosis by comparison with the proposed Californian ambient air standard is very low."

15.2.4 DISCUSSION

The Panel has followed the logic and the calculations incorporated in the risk assessments and finds that they are convincing. However the Panel does have some concern about the reliance on the limited and apparently variable measurements of PM_{10}, $PM_{2.5}$ and the % silica in the $PM_{2.5}$ samples. These were important inputs to the risk assessments performed for the proponent. Furthermore, the restriction placed on particle sizes due to the reliance on $PM_{2.5}$ instead of having a wider range of particles as might be measured by a PM_5 is a concern. However this is an understandable limitation of data because measurements of PM_5 are not common.

It is obvious that there are differing views on the use of $PM_{2.5}$ versus PM_{10} for health risk assessments for fine particles, whether or not they contain silica, and this is seen in the commentary in the EPA submission and the response by Toxicos. This controversy is further complicated by the variation in standards adopted by different authorities and in different countries. Both Toxicos and the EPA acknowledged this variation and recognise that health risk assessment is not an exact science. The Panel therefore understands why the risk assessment has included a number of different assessments so as to provide sufficient evidence on which to draw a reasoned conclusion about the risks.

While the concerns mentioned above are real and legitimate, they do not in the view of the Panel negate or challenge the conclusions drawn in the risk assessment undertaken on behalf of IPRH.

The Panel notes that the EPA has been somewhat critical of some aspects of the health risk assessments performed by Toxicos and that Toxicos has responded with convincing arguments about the comments made by the EPA. Of particular interest to the Panel is the submission from the Department of Human Services, which the Panel sees as being the prime health authority for the Victorian Government, appears to be quite accepting of the assessments made and concluded that:

> *"Crystalline silica is unlikely to impact on the health of the local residents near to West Field operations.*
>
> *This is based on the presence of relatively low percentages of crystalline silica in dusts, the fact that the silica at Hazelwood is less 'fibrogenic' than the type considered throughout the risk assessment, and importantly, International Power have committed to a responsive dust-monitoring program to ensure that 'off-site' impacts of dusts (and its components) will not impact on public health.'*

Included in the response by Toxicos to the EPA submission was the following important statement made by the World Health Organisation (WHO 2000) about their evaluation of crystalline silica, quartz.

> *"To date, there are no known adverse health effects associated with non-occupational exposure to quartz dust."*

While the concerns mentioned by the EPA may or may not be real in a practical sense, they do not in the view of the Panel negate or challenge the conclusions drawn in the risk assessments. It is abundantly clear that there is considerable conservatism in the input data

for the risk assessments, especially the unchallenged statement that the silica in the Hazelwood dust is weathered silica and not 'fresh' crystalline silica. Therefore the Panel accepts that the levels of dust predicted to be experienced by the nearest neighbours to the mine are most unlikely to present a measurable health impact on members of the general public.

The Panel notes the comment from the EPA that the proponent should undertake further measurements of silica during the implementation of the project. The Panel is also aware of the considerable cost of these types of analyses.

Further monitoring of silica

The EPA has recommended that a key issue is to validate crystalline silica air quality modelling and risk assessment through further monitoring. The lung cancer risk assessment and the two silicosis risk assessments all indicate the low to very low to negligible levels of risk. As mentioned above, the Panel places particular importance on the conservatism in both the air quality modelling of dust and the various assumptions in the health risk assessments. On this basis the Panel does not see any need for the proponent to undertake further measurements of the silica levels in dust.

This conclusion is quite separate to the information provided by the proponent that the analyses for silica are quite expensive. This becomes an added reason for accepting that the gaining of additional data is not justified on the basis of risks to public health.

A comment on modelling and risk assessments

In more generalised terms, the Panel would have preferred to see both the air quality modelling and health risk assessments based on a most likely scenario (for any number of years that are considered particularly important) rather than incorporating conservative elements in a base case. If a most likely scenario is used as a base case, the more conservative inputs can then be used to assess the effects that 'adverse conditions' might have on the results. The term 'worst case scenario' has purposely been avoided in this commentary because it is usually very difficult to identify what really is THE WORST CASE. 'Worst case scenarios' are not especially helpful, particularly if the probability of such an occurrence is almost zero.

15.2.5 CONCLUSIONS ON HEALTH IMPLICATIONS OF SILICA

The risk assessments performed for silica in dust, which is a causative factor for lung cancer and silicosis, have been thorough and convincing. Like the dust modelling, the risk assessments have been conservative. This especially applies to the assumption throughout the risk assessment procedures that the silica in the dust is fresh crystalline silica. The evidence shows that the silica in the dust expected to be generated by the construction and mining activities is weathered silica. The health impacts shown to be due to silica have been associated with exposures to fresh crystalline silica and not weathered silica.

On the basis of these risk assessments, the Panel concludes that the health impacts on neighbours and the general public are very unlikely to be significant or indeed measurable.

15.2.6 RECOMMENDATIONS ON SILICA MONITORING

The Panel recommends that in view of the conservative assumptions used in the risk assessments and the very low levels of risk of adverse health impacts, additional monitoring of silica is unnecessary, would be a poor use of resources, and should not be required.

16. NOISE

16.1 NOISE POLICY

Three sources of noise (unwanted sound) are recognised as being associated with the West Field Project:

- construction noise from the activities of the road and river diversions – years 2005, 2005/2006 and 2006/2007;
- 0perational activities on the mine – continuous for approximately 25 years. The assessment focuses on the years 2011 and 2028, being years during which noise impacts are likely to be greatest;
- road traffic noise from the relocated Strzelecki Highway – continuous but this assessment focuses on the year 2016.

The following definitions may be useful in understanding the following discussion of noise.

Sound is usually expressed in terms of dBA where dB means decibel (a unit used to measure the sound pressure level) and A means an adjusted sound level that approximately matches human hearing of different frequencies of sound. It is often referred to as an A-weighted sound pressure level.

Noise levels are averaged over time using a number of indexes, e.g. L_{10}, L_{90}, $L10_{18\ hour}$ and L_{Aeq}. Background noise levels are usually expressed in dBA as L_{90}, which is the sound level exceeded for 90% of the time period. L_{Aeq} is the equivalent continuous A-weighted sound pressure level (like an average level of sound) that contains the same amount of acoustical energy as the corresponding time-varying A-weighted sound over the same time period. Prediction and measurement of noise is generally done using the L_{Aeq} index, and the result is compared with the relevant standard.

The management of noise from **industrial type premises** in Victoria is primarily covered by a specific *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No N-1*. Strictly speaking this SEPP is only applicable to the Melbourne metropolitan area. Because low background noise levels are common in country areas, the EPA adopted a separate process for dealing with noise for these circumstances – *Interim Guidelines for Control of Noise from Industry in Country Victoria (N-3).* However where background noise levels in country areas are comparable to those in Melbourne, the N-3 Guidelines adopt the SEPP N-1 requirements. Where background noise levels are very low in country areas, eg less than 25 dBA at night and 30 dBA during the day or evening, the N-3 special provisions apply.

Noise management is based on establishing background noise levels, determining the type of zoning, determining acceptable noise limits for various periods of the day (day, evening and night periods) and ensuring that the noise from activities are within the allowable limits. SEPP N-1 defines daytime as 7:00 am to 6:00 pm, evening as 6:00 pm to 10:00 pm and night as 10:00 pm to 7:00 am.

These matters are discussed in the EES in section 11.3 and more detailed information is found in Supporting Study 12.

Construction activities are treated differently to the typical emissions of noise from industrial type premises.

The EPA has issued two other guideline documents for construction noise – "*Best Practice Environmental Management Guidelines, Environmental Guidelines for Major Construction Sites"* and "*Noise Control Guidelines TG302/92"*.

The requirements of particular relevance to the West Field Project are presented under section 4.1 of Supporting Study 12 and are summarised as follows:

- where an activity is likely to cause nuisance to nearby residents its operating hours should be restricted to between 7 am and 6 pm weekdays and between 7 am to 1 pm on Saturdays, except where the activity is unavoidable;
- the noise level at any residential premises should not exceed the background noise levels by more than 10 dBA for up to 18 months since the project commencement (or 5 dBA or more after 18 months) during the hours of 6 pm to 10 pm weekdays, 1 pm to 10 pm on Saturdays and 7 am to 10 pm on Sundays or public holidays;
- noise is to be inaudible within a habitable room of any residential premises during the hours of 10 pm to 7 am Monday to Sunday.

In its submission EPA confirmed that these limits are those listed in the for best practice guidelines.

The general view expressed in the Supporting Study is that construction activities during the day and evening periods are unlikely to be excessive if the construction noise emissions do not exceed the relevant background noise levels by more than 10 dBA. Higher noise levels are usually considered acceptable if the impact period is of a short duration.

There are no specific statutory controls for **noise from roads**. However VicRoads does have an objective for new or improved roads of a noise limit of 63 dBA $L_{10(18\ hour)}$ or the noise level that would have prevailed if the road improvements had not occurred, which ever is the greater (The noise index $L_{10(18\ hour)}$ is the noise level that is exceeded for 10% of the time each hour, averaged over the 18 hours from 6:00 am to midnight).

For schools or other noise-sensitive community buildings, the objective is 63 dBA $L_{10(12\ hour)}$ from 6 am to 6 pm, i.e. measured over a shorter time period because these facilities are not normally occupied for as long a period as a residence.

For buildings where the noise level prior to the road improvements is less than 50 dBA $L_{10(18\ hour)}$, consideration is to be given to limiting the noise level increase to 12 dBA.

16.2 BACKGROUND NOISE LEVELS

Richard Heggie Associates, IPRH's noise consultant, conducted measurements of background noise levels at a sample of 10 residential locations that were likely to be impacted by noise from the construction and mining activities. Three of these residences were to the west of and close to the road and river diversion, four were to the south of and reasonably distant from the road and river diversions, two were to the northwest and reasonably distant

from the road and river diversions and one was located within Morwell Township and reasonably close to the existing mine. These locations are shown in Figure 11.3 of the EES.

Figure 28 Background noise monitoring locations and dwelling locations

The results of the background noise measurements indicated that the background levels were not low because of the noise coming from the Hazelwood mine and power station, other industrial activities and road traffic. The proponent's noise expert judged the noise from the mine and power station was not intrusive but was constant and broadband in nature except for the occasional reversing alarm. Therefore the noise from the mine and power station could be considered to be part of the background noise. On this basis it was concluded that the requirements of SEPP N-1 applied to the noise sensitive locations (nearby residences) rather than the low background noise guidance incorporated in N-3. In addition, there was no need to include any of the SEPP N-1 adjustments for tonality, duration, intermittency, etc.

All 10 residential locations were classed as Type 1 (residential and rural zones) according to the procedures of SEPP N-1. The general noise limits for the Type 1 zoning are 50 dBA for daytime, 44 dBA for evening and 39 dBA for night.

Table 22, which is an updated and abbreviated version of Table 4.1.1 in the Supporting Study, shows the background noise levels and the respective SEPP N-1 derived noise limits for each location. The updated table was included in the Statement of Evidence presented to the Panel on 27/7/2004 (IPRH#13) presented by Mr Gustaf Reutersward of Richard Heggie Associates.

Table 22 SEPP N-1 Noise Limits based on Moe meteorology data

Map Reference	Address	Background Level L_{A90}			SEPP N-1 Limits dBA		
		Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day	Evening	Night
BG1	Lot 44 Yinnar Driffield Road	43	43	35	50	46	39
BG2	135 McNabbs Road	32	30	29	45	40	37
BG3	Lot 120 Walsh & Gibsons Roads	38	34	33	50	42	39
BG4	575 Switchback Road	39	33	29	50	41	37
BG5	140 Golden Gully Road	38	35	34	50	44	39
BG6	Walsh & Gibsons Road	36	33	32	47	41	39
BG7	160 Yinnar Road	39	34	32	50	42	39
BG8	RMB 2820 Outlook Road	38	39	39	50	44	42
BG9	RMB 70 Pleasant Drive	43	44	39	50	47	42
BG10	15 Grandview Grove, Morwell	48	43	38	54	46	41

The most critical locations for any noise measurements and for noise modelling are BG5 and BG6. These are the closest locations to the construction activities for the road and river diversions and later for the West Field mine extension.

However, as the EPA pointed out in their submission:

> *"Although there is no noise limit nominated for construction activities during the daytime period, it is imperative that best practice is engaged for noise control."*

The Panel also notes that the use of "daytime" to describe the proposed noise environment may also be misleading. While the *Best Practice Environmental Management Guidelines, Environmental Guidelines for Major Construction Sites* and the *Noise Control Guidelines TG302/92*.do not proscribe a maximum "daytime" level, "daytime" does not include Saturday after 1:00 pm, or Sunday at all. So significant periods of "daytime" on Saturdays and Sundays are subject to best practice noise limits.

16.2.1 EFFECTS OF METEOROLOGY ON NOISE ASSESSMENTS

The proponent's noise expert included two meteorological based influences that adversely affect noise propagation, i.e. makes the noise more likely to be an environmental nuisance.

The first influence was the effect of **temperature inversions**. These occur when instead of the atmospheric temperature decreasing with height, the temperature decrease changes to a temperature increase. This usually occurs within the first few hundred metres above the ground. The effect of the temperature inversion is to tend to confine the noise (and atmospheric pollution too) to the atmosphere below the inversion layer. As a consequence noise becomes more noticeable.

The NSW EPA (now within the Department of Environment and Conservation) Industrial Noise Policy was used as a basis for assessing whether temperature inversions need to be considered in assessing the noise from the West Field Project. The Policy states:

> *"Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment."*

An analysis of the 1996 meteorological data (1966 data has been used as a typical meteorological year for the area) showed that the occurrence of winter evening and winter night time temperature inversions was significant. For 61% of the time, the inversions that occurred were classed as 'moderate to severe'. Therefore temperature inversion effects needed to part of the noise assessment.

The second influence was the effect of **low wind speeds**. The NSW EPA Industrial Noise Policy was also used as a basis for assessing whether the occurrence of low wind speeds needed to be specifically considered in this assessment of noise. The Policy states:

> *"Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10m height) of 3 m/s or below occur for 30% of the time or more in any assessment period in any season."*

An analysis of the 1966 meteorological data showed that low wind speeds in a direction that would carry sound from the source of noise to the sensitive residential receptors was not a feature of the area. Never the less the noise expert did undertake an assessment of the possible effect of wind by assuming a steady 3 m/s wind blowing in the direction of the source to each receiver.

16.2.2 NOISE MITIGATION MEASURES

The early plans for the road and river diversions involved using a two-shift operation of activities but early noise predictions demonstrated that unacceptable noise impacts were very likely to occur, especially during the more noise-sensitive night period. As a consequence the proponent changed the proposed work schedule to reduce the number of hours to a single 10-hour shift for the 2005 year, and a single 12-hour shift for the later years of the construction phase. This reduced the likely noise impacts to those that are now described in Supporting Study 12.

It was realised that certain noise mitigation procedures would need to be incorporated into the construction and mining activities. These included:

- construction activities with the greatest potential for noise nuisance would be scheduled to occur during the day period only;
- construction contractors would use equipment that is in good working order.
- overburden dumping would be to the internal dump inside the mine pit and therefore shielded from the sensitive noise receptors;
- the construction of 3 m high bunds during site preparation for the expansion of the mining so as to shield surface operating equipment;
- the construction a five major spoil mounds to provide additional shielding to the west, north and south of the mine.

The Panel understands that these mitigation measures have been included as part of the input data to the modelling.

16.3 MODELLING OF NOISE

16.3.1 CONSTRUCTION AND OPERATIONS

The proponent's noise expert used computer modelling to demonstrate the likely noise impacts from the West Field Project. The model used was the SoundPLAN computer program that uses the algorithms developed by CONCOWE (a European oil industry environmental organisation). The EPA accepts this model as being one that is suitable for carrying out noise assessments.

The inputs to the modelling include sources of noise, levels of noise emissions, location of noise emitters, terrain, meteorological data, and location of sensitive noise receptors. It is able to provide various forms of output data but the most important ones are those that are needed to meet the SEPP N-1 requirements, viz. L_{Aeq} for the various time periods.

The various sources of noise, eg bucket wheel excavators in the coalmine, excavators and trucks for the road and river diversions, etc., were identified and their noise emissions (known or measured) used as inputs to the model. Similarly the locations of activities (which change over the period of the construction activities and over the life of the mine), and the changes in terrain due to the activities, were other types of inputs to the model.

One particularly important point to note is the assumption used for the modelling that all plant was considered to be operating continuously at full load, i.e. the noise output was at a

maximum for all time periods. In reality, a large proportion of the mobile equipment would operate on a cycle of activity that would include periods of high noise output (full load) and periods of lower noise output such as would occur during idling. The same would apply to most of the fixed equipment but to a much lesser extent, as fixed equipment is likely to operate continuously and constantly for the majority of the time.

The effect of this assumption is that the modelling is conservative and was estimated to over predict noise levels by approximately 5 dBA. The EPA also acknowledged that the modelling was conservative.

Reversing alarm noise from mobile equipment was purposely excluded as an input to the modelling. This type of noise can be particularly disturbing because of its intermittency and the nature of the noise, which is designed to be easily heard by the human ear. The noise expert took the view that if the noise from alarms became a source of disturbance, the alarm levels should be checked and action taken to reduce the noise emitted without compromising safety.

The proponent selected six scenario years to model noise. Five of these years were selected as being the ones that are representative of the various stages of development of the project and are the years when the highest levels of noise impacts are likely to occur. The sixth scenario year is a specific assessment of road noise. These scenarios are:

- **Construction Year 1 January to May 2005:** Representative of the commencement of excavation of the Morwell River Diversion near Marretts Road and Golden Gully Road, the haulage of spoil material and the formation of the relocated Strzelecki Highway. A single daytime shift of 10 hour is scheduled, 0700 to 1700 hours, Monday to Saturday.
- **Construction Year 2: November 2005 to May 2006:** Continuation at an increased level of excavation for the northern section of the Morwell River Diversion, the haulage of spoil material to spoil mounds 1, 2 and 3, and pavement construction of the relocated Strzelecki Highway. Major works are to be conducted during a single 12-hour shift, extending until 7 pm, Monday to Sunday. The modelled scenario is representative of the construction activity toward the end of the season when excavation works are concentrated near Golden Gully Road. This would be considered the 'worst case' expected impact during the 2006 construction season.
- **Construction Year 3: November 2006 to May 2007:** Excavation for the southern portion of the Morwell River Diversion, the haulage of spoil material and formation of spoil mound 4. Major works are to be conducted during a single 12-hour shift, extending until 7 pm, Monday to Sunday. The modelled scenario is representative of the construction activity approximately one third of the way into the season when excavation works are concentrated near residents near Golden Gully Road and Walsh and Gibsons Road. This would be considered the 'worst case' expected impact for these locations during the 2007 construction season.
- **Operations Year 2011:** Representative of the complete bucket wheel dredger production from the West Field, including overburden removal. A surface earthworks program for the Westfield Block 2B and overburden haulage are scheduled to occur simultaneously with the Office Field.
- **Operations Year 2028:** Representative of the final stages of completion of the West Field Project.
- **Road Traffic Noise 2016:** Representative of an estimated ultimate traffic flow approximately 10 years after the opening of the relocated Strzelecki Highway. An AADT of 3,600 vehicles per day with approximately 7% heavy vehicles (HV) has been

assumed. Traffic is assumed to be travelling at 100 km/h on a Chip-Seal pavement surface.

The results of the modelling of the first 5 scenario years, covering 3 years of the road and river diversions plus the mine operations and 2 years of mine operations are summarised below. The information is based on the data published in the Supporting Study 12 and uses predicted noise levels at 23 residences. Predicted levels are compared to the revised daytime background levels reported above in Table 22.

Construction Year 1 January to May 2005: At most residences the construction noise will be below background noise levels. At BG5 the best practice guideline will be exceeded by 12 dBA after 1:00 pm Saturday.

Construction Year 2: November 2005 to May 2006: At most residences the construction noise will be below background noise levels. Near BG5 the best practice guideline will be exceeded by 11 dBA after 1:00 pm Saturday, and until 6:00 pm on Sunday, and 13 dBA from 6:00 pm to 7:00 pm Sunday.

Construction Year 3: November 2006 to May 2007: At most residences the construction noise will be below background noise levels. Near both BG5 and BG6 the best practice guideline will be exceeded by 12 dBA from 6:00 pm to 7:00 pm Sunday.

Operations Year 2011: The predicted noise levels comply at all receivers during all periods of non-adverse meteorological conditions. During adverse meteorological conditions, exceedances at night near BG7 and BG10 of from 1 to 4 dBA are predicted.

Operations Year 2028: The predicted noise levels comply at all receivers during all periods of non-adverse meteorological conditions. During adverse meteorological conditions, exceedances at night near BG5, BG6 and BG7 of from 1 to 3 dBA are predicted.

The consultant reports that these noise level exceedances would generally be considered as acceptable.

The Panel does not view reported exceedances of 11 to 13 dBA above the ambient noise levels during construction as being acceptable, when the guideline states that acceptable levels are up to 10 dBA above the ambient levels. This should be observed as a maximum exceedance. While the modelling may not present the true picture, clearly adequate monitoring is essential.

Although the Panel appreciates that the exceedances during operations may not be frequent in occurrence, the Panel does not agree that exceedances of 1 to 4 dBA at night are relatively minor exceedances. It is realised that the modelling is conservative, especially due to the assumption that all equipment is operating under full load, thus producing the maximum noise output. Therefore the Panel expects that the actual maximum exceedances would be significantly less than 4 dBA and may not actually exceed the respective noise limits.

In the Panel's view it would have been far preferable for the input to the noise modelling to have been realistic rather than conservative. This would have provided a better perspective of the noise impacts and allowed the impacts of various adverse conditions to be more realistically explored.

16.3.2 NOISE MANAGEMENT AND FURTHER NOISE MITIGATION PROPOSALS

Because of the inherent uncertainty of most forms of modelling, there is almost always a need to conduct monitoring to confirm the predictions of the modelling. Noise modelling is no exception to this general rule. Consequently the Panel is pleased to see the proposal for noise monitoring by IPRH as an aid to the management of noise impacts. The Panel notes that among the various actions planned, the following are included:

- monitoring will be undertaken during the construction and operation periods to validate the noise modelling predictions and to enable additional noise controls to be designed;
- the proponent intends to minimise earthworks during periods when adverse meteorological conditions are likely to occur;
- the proponent intends to keep local residents informed of progress during the construction program;
- a system is to be established to handle inquiries and complaints and to instigate appropriate actions to reduce noise;
- haul truck routes will be designed to minimise the need for reversing and thus minimise the use of reversing alarms.

16.3.3 ROAD TRAFFIC NOISE

Predictions of future road traffic noise at all 23 residential locations are within the VicRoads criteria of 63 dBA $L_{10(18\ hour)}$. 16 of the sites had existing noise levels (measured or predicted) that were less than 50 dBA $L_{10(18\ hour)}$ and in no case at these sites did the predicted noise increase by more than 12 dBA.

16.4 DISCUSSION

The EPA in its submission, rightly in the Panel's view, expressed reservations about the background noise measurement program undertaken by the proponent's noise expert. The Panel, like the EPA, was concerned about the use of the meteorological data from the Rosedale South meteorological station for the background noise monitoring when data from nearer stations was known to have been available. The discarding of 69% of the data during the first week of recordings due to excess wind noise affecting the microphones of the monitoring equipment was obviously questionable. The Panel agrees with the EPA that the background data needed to be reconsidered.

The Panel notes that a re-assessment of the data using meteorological data from a more relevant monitoring station has been carried out. The result is that there has been a significant reduction in the discarding of data due to the possible wind effects on microphones. There has been a general reduction in the background noise levels, typically of 1 or 2 dBA, although a third of the data have not changed. The changes to the SEPP N-1 derived noise limits have been less than for the background noise levels. About 60% of the levels have not changed and where the data has changed the typical change has been a reduction of 1 or 2 dBA.

The Panel understands that the noise modelling is clearly conservative and notes the expert witness view is that the level of conservatism is about 5 dBA. The EPA did not challenge this view.

After allowing for the stated estimate of conservatism, the Panel expects that nearby residents to the construction activities for the road and river diversions are unlikely to suffer additional noise deemed unacceptable in the EPA policy guidelines. Because of the uncertainly resulting from the monitoring and the modelling, the Panel considers that it is essential to have an effective monitoring program for noise measured at a number of locations, e.g. selected noise sensitive residences.

In particular the Panel agrees with the EPA that *'Appropriate management and control measures should be detailed in a Construction EMP to achieve the desired noise levels for construction*.' The Panel also agrees that *'a noise monitoring program ……..be developed as part of the EMP for Phase 2 of the West Field Project.'*

In his expert witness evidence, Mr Gustaf Reutersward of Richard Heggie Associates advised that:

> *"It is anticipated that pre-construction noise monitoring will be conducted and that routine noise monitoring during the construction period, including attended surveys, will be outlined in detail in the Construction EMP."*

While the Panel certainly agrees with the thrust of the intentions outlined above, the Panel considers that noise monitoring should be given an increased commitment by IPRH. Neither the unattended measurement of background noise levels nor the modelling undertaken for the future construction and operation activities were sufficiently convincing to conclude that noise would not be a problem. Monitoring prior to construction using more attended monitoring is needed to provide a robust base for comparison with the noise monitoring during the construction phase.

Monitoring at the most sensitive noise locations is definitely required, and should be undertaken in response to complaints until sufficient experience is obtained to use professional judgement augmented by some measurements.

With respect to road traffic noise, the Panel notes that the proponent intends to construct several 2 m high spoil mounds along the relocated Strzelecki Highway to reduce the impact of road noise on nearby residences.

The Panel also notes that the year chosen for the road noise modelling was 2016, which is 10 years after the opening of the diverted Strzelecki Highway. This appears to be a reasonable time to allow the vehicle usage to build up after the relocation of the Highway and for additional usage in the foreseeable future, and is consistent with the VicRoads guidelines.

The results of the modelling are very clear with the modelled road noise being well below the VicRoads criteria. The Panel notes that at nearly 75% of residences, the predicted road noise is less than the existing noise levels at the residences. Therefore the Panel expects that road noise is very unlikely to present a problem at nearby residences along the diverted Strzelecki Highway.

16.4.1 CONCLUSION ON NOISE

The Panel has some concerns about the background noise measurements and the methodology used in modelling future noise by IPRH's noise consultant. The use of excessively conservative data, e.g. noise from all equipment being under full load as input to the noise model, is not very convincing. The statement that because of the conservatism, the predicted noise levels are up to about 5 dBA seems to be a sweeping over simplification.

While the general outcome of the noise modelling is that noise is unlikely to be a serious nuisance to neighbours, this is not beyond doubt. For this reason the Panel's view is that the planned monitoring program for the West Field Project needs to be carefully considered. Further manned background measurements should be carried out at sites where exceedances are most likely (BG5, BG6 and BG7), and monitoring of noise arising from the construction and operations should be undertaken in response to complaints until sufficient experience is obtained to use professional judgement, augmented by some measurements. Final details of the additional background measurements and the frequency of monitoring measurements should be decided in consultation with EPA.

16.4.2 RECOMMENDATIONS ON NOISE

The Panel recommends that a noise monitoring program be prepared in consultation with EPA, and implemented. The noise monitoring program should:

- **Give attention to measuring further background noise levels at the representative residential receivers adjacent to residences that have been predicted to exceed the best practice guideline levels;**
- **Be responsive to complaints;**
- **Use manned measurements.**

17. GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION

17.1 REGULATORY REQUIREMENTS

As described in Section 3.3.5 above, Hazelwood Mine and Hazelwood Power Station are scheduled premises under the Environment Protection Act 1970, and mining activities are subject to EPA Licence EM30856. Hazelwood Mine discharges wastewater to the Morwell River under the terms and conditions of its licence.

EPA has determined that the West Field Project will require a Works Approval for the wastewater discharges associated with the construction of the road deviation and stream diversion works. The Works Approval includes the need to satisfy appropriate Protocols for Environmental Management (PEM). In the case of the West Field Project, the need is to satisfy the Protocol for Environmental Management (Greenhouse Gas Emissions and Energy Efficiency in Industry). This incorporates a requirement for the compilation of an emissions inventory of the road deviation and stream diversion construction works.

The PEM also requires an emissions reduction program that is based on the conduct of an energy audit of the operations. IPRH has recently conducted an energy audit of the South East Field and the West Field (Phase 1). This was used as part of the Emissions Reduction Plan for the existing operations and was submitted to the EPA in 2003.

The EPA described the requirements of the PEM as follows:

> *"For the operation of the Hazelwood Power Station and Mine the SEPP (AQM) and incorporated GH PEM greenhouse gas emissions is addressing greenhouse emission through the development of a Greenhouse Action Plan. The evaluation of greenhouse emissions through energy use in the Hazelwood Mine is required by the GH PEM as part of the development of the Action Plan for the site. The GH PEM requires actions to be evaluated for efficient energy use and requires that actions that have an economic payback of 3 years must be carried out. The GH PEM is for projects to the end of 2006. A new GH PEM or other greenhouse program is likely to be developed at this stage to further drive energy efficiency and greenhouse gas mitigation."*

The proponent is a member of the Federal Government Greenhouse Challenge Program, which requires annual reporting of greenhouse gas emissions and actions to reduce greenhouse gas emissions. As part of this program, the proponent has committed to planting 2,500 native trees each year but has generally planted 3,000 to ensure that 2,500 survive.

Information about greenhouse gas emissions arising from the construction of the road and river diversion works and from plant involved in the winning of coal from the Phase 2 West Field Project is discussed in section 10.6 of the EES and a more detailed consideration of the subject matter in provided in Supporting Study 9.

17.2 CURRENT AND FUTURE GREENHOUSE GAS EMISSIONS

The 2002 data on greenhouse gas emissions in the PEM submission to the EPA in 2003 has been used by the proponent as a base year for the further studies that have been undertaken by a specialist consulting company. This company has conducted an annual inventory of emissions and the data formed an important part of Supporting Study 9. The work undertaken has involved estimating emissions each year from 2005 (the start of the construction of the road and river diversions) until 2031 when mining is expected to cease.

Greenhouse gases included in the annual inventory were carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). These gases are generated from the direct or indirect combustion of fuels. The emissions are expressed in terms of carbon dioxide equivalent (CO_2-e), which takes into account the different effectiveness of the gases as greenhouse gases. Methane is a much more effective greenhouse gas than carbon dioxide (about 21 times that of carbon dioxide) and nitrous oxide is even more effective. Although carbon dioxide is a less effective green house gas than these two gases, it dominates the greenhouse effect – strictly speaking the 'enhanced' greenhouse effect – because of the very large tonnages of the gas emitted to the world's atmosphere each year.

Other greenhouse gases such as perfluorocarbons, halofluorocarbons and sulphur hexafluoride have not been included in the inventory, as the proponent's activities show that their rate of emissions, if any, would be negligible. Seepage of methane from coal seams is a common occurrence but this is not the case with brown coal in the Latrobe Valley. For this reason, these fugitive emissions of methane have also been assessed as being negligible.

The emissions of greenhouse gases from the West Field Project are dominated by carbon dioxide. Although the tonnages are large they are quite small compared to the emissions from the power station. It was reported that the greenhouse gas emissions from the West Field Project are equivalent to about 1% of the greenhouse gases from the generation of electricity at the power station. The activities of the Project that produce the carbon dioxide are the road and river diversions (mainly from the combustion of hydrocarbon fuels in mobile equipment) and the mining operations (mainly from the generation of electricity to power the mining equipment plus some use of hydrocarbon fuels). Activities that were included in the inventory were:

- road and stream relocation with truck and shovel;
- overburden removal by truck and shovel;
- overburden removal and placement by bucket-wheel excavator and conveyors.
- coal extraction by bucket-wheel excavator and conveyors;
- aquifer pumping;
- other mine energy use (includes other pumping, coal supply to Energy Brix, lighting and offices).

The details of the estimated greenhouse gas emissions are provided in Supporting Study 9 and the reader will find a full set of data in Table 4 on page 18 of the report. Table 23 is a selection of data for the most significant years and is the same data as provided in Table 1 of the Supporting Study 9.

Table 23 Annual emissions (Tonnes CO_2-e) for 2002 (base year), 2006 (road and river diversion & mining), 2012 (maximum emissions) and 2014 (mining)

Activity	2002 Base Year South East Field	2006 Road & River Works (Highest emissions)	2012 Mining & overburden removal (Highest emissions)	2014 Mining & overburden removal
Road and River Diversion with Truck & Shovel		***9,707***		
Overburden Removal by Truck & Shovel	19,570	3,356	***25,816***	
Overburden Removal & Storage by Bucket-wheel Excavator and Conveyors	13,461	9,354	***8,719***	***8,263***
Coal Extraction by Bucket-wheel Excavator and Conveyors	32,714	37,748	16,228 + ***20,975***	***37,457***
Aquifer Pumping	24,568	19,259	31,154	25,490
Other Mine Energy Use (includes other pumping (~90%), coal supply to Energy Brix (~7%) and lighting and offices)	64,177	63,035	63,035	63,035
Total Greenhouse Gas Emissions	**154,490**	**142,458**	**165,927**	**134,245**

2002 is the base year using data from the South East Field that is currently being mined.

2006 is the year with the highest emissions from the road and river diversions.

2012 is the year with the highest annual emissions due to the major overburden removal for the West Field.

2014 is the first year after completion of Phase 1 and with the full production of Phase 2 of the West Field.

In the above table the emissions associated exclusively with the West Field Phase 2 activities are in a large font size and in bold italics.

The overall uncertainty of the emissions data (excluding aquifer pumping and the 'other' category activity) was estimated to be ± 7%.

The Panel notes that the annual amounts of the greenhouse gas emissions are very dependant on the activities to be conducted during any particular 12-month period. The projected total greenhouse gas emissions increase significantly during the early development of Phase 2 of the West Field (2009 to 2012) due mainly to the removal of overburden to open up the new coal. Another period of increased greenhouse gas emissions occurs towards the end of the mining (2027 to 2031) when the deeper parts of the pit are to be mined, which requires increased aquifer pumping to prevent heave on the floor of the mine and to prevent instability of the batters. The Panel is also uncertain why aquifer pumping is not associated with Phase 2 until 2017, near the end of coal mining in Block 1C.

For more detailed explanations of the activities assessed in developing the inventory of annual greenhouse gas emissions, the reader is referred to Supporting Study 9.

17.3 MANAGEMENT OF GREENHOUSE GAS EMISSIONS

IPRH is required to manage its activities with the aim of avoiding greenhouse gas emissions, reducing the emissions by the use of best practice reduction techniques and generally seeking ways to continue improvements to reduce greenhouse gas emissions per unit of operation, e.g. per tonne of overburden moved, per tonne of coal mined.

The EES and the Supporting Study lists a number of actions that have been identified to reduce greenhouse gas emissions and these include:

Road and river diversions

- avoiding construction during the likely wetter and less energy efficient periods of May to November;
- specifying the energy efficiency characteristics of equipment to be used on the project;
- minimising energy use through scheduling and minimisation of haulage distances;
- monitoring monthly figures on fuel consumption and volumes;
- specifying qualifications of plant operators to be employed for the project;
- considering the use of alternative fuels (e.g., bio-diesel) and monitoring their availability and pricing that would allow for their use;

Mining of the West Field

- monitoring of energy use by:
  - monthly reporting of energy use on site;
  - activity (e.g., top soil, overburden, coal);
  - fuel and energy usage (e.g., diesel, electricity);
  - increased real-time monitoring of electricity use by specific equipment (e.g., individual bucket-wheel excavators and conveyor systems);
- calculation of greenhouse gas emissions;
- application of policies and procedures developed for efficient mine operation;
- implementation of proposed emission reduction activities;
- identification and incorporation of new emission reduction activities;
- reporting of energy use, greenhouse emissions and progress against planned actions to regulatory authorities.

One specific evaluation undertaken to assess energy usage was the comparison of coal mining activities. The proponent needs to mine approximately 18 million tonnes of coal annually so that even quite small savings in energy usage per tonne of coal mined becomes a significant total saving. Similarly there are potential gains to be made in energy efficiency of the equipment used for the removal and transport of overburden.

An assessment of three coal mining options was undertaken as part of the greenhouse gas emission considerations. The results of the assessment are well illustrated by a table that appeared in the EES (Table 10.13), which was also in the Supporting Study. The data is reproduced below in Table 24.

Table 24 Comparison of coal extraction methods

Method	Emissions intensity (kg CO_2-e/tonne coal)
Truck and shovel to raw coal bunker	4.50
Bulldozer feed to hopper and conveyors	2.48
Bucket-wheel excavator and conveyors (current practice)	2.49

Clearly the coal mining method of using a truck and shovel operation is much more greenhouse gas intensive than the other options. The difference between the other two options is very small and well less than the level of uncertainty about the estimates. In other words, the data is insufficiently precise to draw any valid conclusion that one option is significantly different to the other.

The proponent expressed their preference to continue with the bucket wheel excavator and conveyors as their current equipment was expected to be able to remain in service until the cessation of mining of the West Field, and this matter is addressed in Section 9.2 above.

17.4 DISCUSSION

The Panel was somewhat surprised that emissions in the 'Other Mine Energy Use' category were such a large proportion of the total emissions, being around 40% of the total for most years. The emissions in this category are primarily related to pumping, eg dirty water for fire service system, dust suppression and conveyor cleaning. The total emissions in this category are obviously greater than the emissions related to the pumping of water from the aquifers.

During questioning, the proponent advised the Panel that the main reason for the large amount of pumping combined together in the 'Other Mine Energy Use' category was the lack of instrumentation to measure the electricity consumed by the various pumps. The proponent also advised that it was intended to provide meters for these pumps so that energy use could be monitored in future years. The Panel sees this move as a very positive action as it is likely to lead to increased efficiencies in the pumping programs and possible replacement of some pumps with more efficient ones. The annual inventory shows a constant tonnage of greenhouse gas emissions for this category of 63,035 tonnes of carbon dioxide equivalent (CO_2-e) per year from 2005 to 2031. The Panel therefore believes that the proponent should reassess the estimates of greenhouse gas emissions in this category with the aim of increasing the efficiency of pumping in future years.

In other respects the proposals for minimising greenhouse gas emissions from the road and river diversions seem appropriate.

There are only limited opportunities for major changes to the actual mining of coal. It seems that it must involve the current processes - remove the overburden, dig the coal and then transport it by some appropriate means to the point of usage. For these very basic reasons, it appears there are limited opportunities for major increases in energy efficiency in open cut coal mining. As a consequence it is unlikely that there will be large decreases in greenhouse gas emissions from coal mining.

The area of concern to the Panel is, as stated above, is the better management of the 'Other Mine Energy Use'.

17.4.1 CONCLUSIONS ON GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION

The assessment of greenhouse gas emissions from the construction of the road and river diversions and from coal mining has been adequately addressed in the EES. Procedures to monitor fuel and electricity use have been identified, as have actions to improve energy efficiency. The nature of the construction and operational activities does limit the opportunity to make large-scale reductions in greenhouse gas emissions through the use of new technologies. Never the less the Panel's view is that some efficiency gains are still possible, especially with the pumping activities associated with the mine, which will continue till mine closure.

17.4.2 RECOMMENDATIONS ON GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION

The Panel recommends that the opportunity to reduce the major source of greenhouse gases from the mining – the pumping of water included in 'Other mine energy use' - be further investigated and practical action taken to increase the energy efficiency of the pumping.

18. GREENHOUSE GAS EMISSIONS FROM HAZELWOOD POWER STATION

18.1 GOVERNMENT POLICY

18.1.1 THE BROWN COAL TENDER

Reference to the Brown Coal Tenders was made in Section 10 above. As part of its submissions to the Initial Hearings, the Department of Primary industry tabled Fact Sheets 1 and 2 about the Tender process (see DPI#2). Fact Sheet 1 included the statement that:

> *There is a clear expectation that any successful proposal will include processes and/or technologies that will deliver reduced greenhouse gas emissions consistent with Victoria's need to be an active and effective participant in meeting the challenge of global warming.*

As reported in Section 10.1.2 above, Submission DPI#5 to the Initial Hearings provided a copy of Schedule 18 (Prescribed Licence Document) to Exploration Licence 4685 held by HRL Limited. This Schedule states, in part:

> *In assessing any Mining Licence Application(s), the Department will consider the following matters:-*
>
> - *…*
> - *Total emissions for the proposed new power station should not exceed the lower of 0.82 tonnes CO_2/MWh or world's best commercial practice at the time of plant design finalisation.*

DPI referred to the Brown Coal Tender as a policy setting, and the Panel understands that the requirements for greenhouse gas emissions set out in the Exploration Licence for HRL (as noted above) are common to all tenderers.

18.1.2 THE GREENHOUSE CHALLENGE FOR ENERGY

The Government's Position Paper "*The Greenhouse Challenge for Energy—Driving Investment, creating jobs and reducing emissions*" was published in December 2004 after the initial exhibition and hearings on the Phase 2 of the West Field Mine, but prior to the Directions Hearing for the reconvened hearings to consider greenhouse emissions from the Hazelwood Power Station. The foreword by the Minister for the Environment (John Thwaites) and the Minister for Energy Industries and Resources (Theo Theophanous) includes statements that:

- The position paper builds on the earlier 2003 consultation paper;
- "*It is critical that the Victorian Government institutes a policy framework to facilitate Victoria's transition to a carbon-constrained future, in a way that maintains the State's*

economic prosperity and growth; provides certainty to investors; and ensures the Latrobe Valley's long-term viability as Victoria's major energy producer."; and

- "*A strong conclusion from economic modelling conducted by the Allen Consulting Group and reported on in the Position Paper is that we must start this transition now*."

The Background section of the Position Paper points to the growing acceptance internationally of the need for deep cuts in greenhouse gas emissions this century, and the UK goal to reduce greenhouse gas emissions by 60% by 2050. It states that Australia's Chief Scientist has indicated that Australia has to move to a position where we accept deep reductions in CO_2 emissions in the order of 50 per cent by 2050.

The Position Paper documents that the stationary energy sector is responsible for around 72 per cent of Victoria's total net greenhouse emissions, and electricity generation alone is responsible for 55 per cent of the total emissions.

The following suite of measures is supported by the Victorian Government:

- a national emissions trading scheme;
- emissions reporting and disclosure requirements for large emitters;
- a Victorian Energy Technology Innovation Strategy;
- a Victorian Renewable Energy Strategy;
- a Victorian Energy Efficiency Strategy.

The Chapter headed "Purpose" (a summary of the Position Paper) concludes:

> *"The Victorian Government believes that this policy package provides the certainty required by industry to make long-term investment plans. Importantly, the package will encourage the development, demonstration and commercialisation of low-emission energy technologies and actively facilitate the development of new low-emission generation capacity in Victoria to meet growing energy demands and ensure a secure, affordable and sustainable supply of electricity."*

There was some discussion at the Panel hearing about whether the Position Paper was a Government Policy, or more of a discussion document on which public comment is now sought. While it is true that comment on the Position paper is being sought, the Panel noted the context for this, set out in the Foreword as follows:

> *"Your feedback on the issues raised in this Paper is important to ensure that the elements of the package are implemented in the most efficient and effective manner possible."*

In other words, the elements are given, the implementation is open to submissions. The submission and presentation to the Panel by Richard Bolt, Executive Director, Energy and Security, Department of Infrastructure makes clear that the paper is policy, with the statement:

> *"The submission addresses the following matters:*
>
> - *The Government's policy on reducing greenhouse emissions from the energy sector, as explained in the recently released Greenhouse Challenge for Energy Position Paper.*
> - *…."*

18.2 THE POTENTIAL FUTURE CARBON CONSTRAINED ECONOMY — REGULATION AND MARKET MECHANISMS

There was considerable discussion at the Panel Hearing on the desirability and efficiency of regulatory and market mechanisms. While there was virtually unanimous support for the inevitability of a carbon constrained economy, a number of submitters argued that regulation was inefficient, and that market mechanisms were preferred to achieve the most cost-effective results. Examples of these arguments are mentioned in the paragraphs below.

Australian Power & Energy Ltd (now taken over by Anglo American plc) was represented by David Lea, who pointed to the multi faceted Victorian approach involving market mechanisms to reduce emissions, and incentives to develop new technologies and improve energy efficiency. He stated that actions to enforce emission reductions outside of such an agreed framework are unacceptable, being arbitrary and inequitable, and having the potential to be counterproductive.

Chris Fraser and Peter Morris appeared for the Minerals Council of Australia, and concluded their written submission (MCA#7) to the Panel as follows:

> *"Given the market failure in the case of greenhouse where emissions are not adequately factored into the market, it is submitted that* ***market based regulatory mechanisms will result in more efficient economic outcomes (i.e. abatement at lower cost) than other (more blunt) regulatory approaches****." (*bold type as in the original*).*

The view presented by EDO on behalf if its clients (WWF Australia, Environment Victoria, the Australian Conservation Foundation and the Climate Action Network Australia), is outlined in its submission to the Panel (EDO#13), and states in para 15:

> *"…Many have suggested that an emissions trading scheme ('ETS') coupled with robust and ambitious reduction targets, would be the most efficient way of addressing greenhouse pollution. We do not disagree. However, in the absence of an ETS the worst performers should be targeted individually to meet the long-term interests of Victoria and position this state to grow in the carbon-constrained economy."*

The Allen Consulting Group report "*The Greenhouse Challenge for Energy*" prepared for Government and dated September 2004 provides an extensive discussion on the merits of regulation and market mechanisms. While endorsing the general view that market mechanisms can provide the most efficient and effective means of providing incentives for greenhouse gas emission abatement, it cautions that potential market imperfections and barriers can prevent optimal investment by businesses and households. It groups these imperfections under the general headings:

- *Insufficient number of participants;*
- *Transactions and information costs;*
- *The presence of externalities or public goods; and*
- *Distortions in related markets affecting factor pricing.*

Section 7.4 of The Allen Consulting Group report (Regulatory and tax-based measures) cites several Victorian regulations (*5-star energy efficiency standard* for new houses, *Minimum Energy Performance Standards* for appliances) which have been successful, and offer, in the particular case, a more efficient and effective approach than a market-based measure. On the supply side, after noting the potential advantages on the supply side of an emissions trading scheme, it states:

> "*On the other hand, adopting a single 850kg per MWh standard for new plant could be a useful measure to draw a line for the future, particularly in relation to new brown coal generation. Such a measure could provide a complement to incentives for RDD&C (research, development, demonstration and commercialisation) sending a strong signal to investors. Such an approach could then be justified for an individual state in the absence of a national agreement as an interim, transitional measure*."

This is indeed the interim policy adopted by the Victorian Government for the Brown Coal Tender process, as will be described in Section 18.5 below.

The Department of Infrastructure submitted (page 4 of their written submission):

> *"In the Greenhouse Challenge for Energy Position Paper, the Government has stated that, once a national emissions trading scheme is introduced, it will review existing policies addressing greenhouse gas emissions from the energy sector to ensure that overall policy settings are efficient and that duplication or unnecessary imposts are removed. It has also foreshadowed that it may integrate the requirements of the Brown Coal Tender and any agreement with IPRH into an interim policy on limiting emissions from the energy sector prior to the establishment of emissions trading."*

The Panel sought further information on just how an Emissions Trading Scheme would operate. Mr Richard Bolt referred the Panel to discussion of this matter in the Greenhouse Challenge for Energy, and provided additional comment. Some of the variables to be decided before any scheme is implemented are:

- the limit for the amount of emissions permitted in the sectors subject to the scheme;
- the ways of allocating the permits (free of charge based on historical emissions— referred to as 'grandfathering'; auctioned,; or some combination);
- the duration of the allocated permits, and monitoring periods.

During the currency of the scheme, further issues will arise, including;

- How to treat new entrants;
- If monitoring shows that the desired cuts in greenhouse gases are not being achieved, the way the scheme is amended.

In relation to this last point, and in relation to any agreement that might be reached with IPRH, Mr Bolt made it clear that the details of any future emissions trading scheme were not yet set, and there would need to be flexibility in whatever was decided in relation to the IPRH Deed. Core and non-core terms were possible. The agreement would likely be definitive to a point, but conditioned by technology improvements.

Mr Bolt further advised that:

- emissions trading will work best where there are no plant specific requirements;
- grandfathering is project specific, and it is a distributive mechanism. DoI analysis is confirming that grandfathering is an important means of minimising power costs;
- the Brown Coal Tender requirements may become a benchmark for grandfathering;
- the issue of whether holders of grandfathered permits will be allowed to sell any permits in excess of their needs requires careful consideration, noting that in Europe a precedent had been made that such windfall profits are not allowed.

Through discussion it became clear that ETS in principle provides a market mechanism that is fair to all. Its implementation, however, needs to address issues like grandfathering, new

entrants, the progressive recall of permits to lower the "cap" of greenhouse gas emissions, and changes to the arrangements if the scheme as implemented fails to deliver the desired outcomes. All these matters require government intervention, moving an ETS from the ideal "market mechanism" to something of a mix between a market mechanisms and regulation.

Another significant issue was expressed by a number of submitters relating to measures that might be put in place by Victoria acting alone, whether regulatory or market-driven. The common concern was that if such measures were punitive, and led to electricity price rises, industry would move off-shore. The global emissions of CO_2 under that scenario would be increased.

18.3 THE REGULATORY REGIME

Various voluntary and mandatory programs affecting the electricity generation industry have been mentioned by IPRH, Government Agencies and various submitters, including:

- the Australian Government's Mandatory Renewable Energy Target (MRET);
- the National Greenhouse Strategy (1998), and two nominated programs, namely;
  - the Generator Efficiency Standards;
  - the Greenhouse Challenge program;
- the Victorian EPA's mandatory energy efficiency audits for licence holders;
- the Victorian State Environmental Protection Policy (Air Quality Management) [SEPP(AQM)] and protocols for environmental management (PEM's) that may be developed under it;

MRET requires that retailers of electricity source 2% of their requirements from renewable energy. It is not a constraint on the operation of Hazelwood Power Station.

IPRH has documented its performance in relation to the Federal Government's programs under the National Greenhouse Strategy in its Annual Report on the environment, health & safety and community 2003, submitted as Attachment D to IPRH#55. While the Generator Efficiency Standards Program is a voluntary program, IPRH have worked with the Australian Greenhouse Office to develop the scheme, and has signed up to it. IPRH has also entered a legally binding five-year deed of agreement with the AGO. IPRH reported that its environmental improvements have resulted in a significant reduction in greenhouse intensity since 1996, resulting in a greenhouse emissions offset in 2002 of approximately 1.3 million tonnes of CO_2-e and a total greenhouse emissions offset over the six years of approximately 6.7 million tonnes of CO_2-e, based upon the 1996 base year.

In its submission EPA#3 to the Initial Hearings, EPA clarified the three State processes being undertaken with respect to greenhouse gases as follows:

> *"Routine ongoing operations" of the power station and mine are covered by an action plan submitted to EPA for approval under the PEM "Greenhouse Gas Emissions and Energy Efficiency in Industry" (PEM(GGEE)). This is a process applying to all EPA licence holders, who must:*
>
> *a) assess annual energy usage and energy-related GHG emissions*
>
> *b) large energy users (eg IPRH) are then required to undertake an energy audit and develop an action plan containing actions to reduce their energy consumption. The*

requirement is that actions that have a simple payback period of three years or less must be included in the action plan for implementation between 2004 and 2006.

The IPRH action plan has been approved by EPA. The future of this PEM program beyond 2006 is not known, but one would imagine that some similar requirements will be in place into the future.

The process of negotiated energy reductions occurring between the Minister for Energy and IPRH in relation to Hazelwood Power Station is separate to the above and does not involve EPA. The resulting actions will presumably be undertaken largely beyond 2006, and the actions may or may not have a payback period of 3 years or less. These actions are not likely to be included in the PEM action plan.

The PEM requires applicants for EPA works approval to assess their proposed works and ensure that "best practice" energy efficiency is applied. This IPRH works approval must comply with these requirements. The scope of the works approval is the river and road diversion works, so energy efficiency of the earthmoving equipment etc is the main feature of this assessment.

At the request of the Panel, IPRH tabled a letter from EPA dated 19 October 2004, in which IPRH's Greenhouse Gas Abatement Program, and further information supplied, was approved as meeting the requirements of the PEM(GGEE). The Action Plan for the years 2004 to 2006 provides for an additional 192,546 tCO_2-e/yr reduction in direct emissions and 1811 tCO_2-e/yr reduction from in-house energy related emissions, on top of the 607,749 tCO_2-e/yr annual savings to the end of 2003. The reduction in direct emissions from the Hazelwood Power Station is the same reduction as that committed to under the Generator Efficiency Standards Program.

EPA has advised that no Works Approval was required for the Hazelwood Power Station, as the quality and volume of coal to be burnt had not changed. EDO challenged that view, and Mr John Marsiglio undertook to obtain further legal advice on the issue.

Mr Marsiglio subsequently tabled EPA#4, which provided advice that:

- IPRH has held a licence under S.20 of the Environment Protection Act since 30 April 1997. The licence provides for specific limits as to the nature and volume of certain wastes that can be discharged or emitted to the atmosphere;
- There is no requirement for licences to have expiry dates. S.26 of the Act specifically provides that *"A licence shall remain in force until revoked, suspended or surrendered"*;
- The proposal will not result in an increase or alteration to the permitted levels of waste which can be discharged or emitted to the atmosphere from HPS under the current licence;
- Section 19A(1) of the Act only has application if as a result of an alteration to the type of fuel used it is likely that there will be "…*an increase or alteration in the waste discharged or emitted to the atmosphere*". As there will not be an increase or alteration in the waste discharged or emitted to the atmosphere as provided for in the licence, there is no requirement for a works approval to be obtained under S.19A(1), and accordingly S.26D(2) of the Act has no application.

18.4 HAZELWOOD POWER STATION — EXISTING CONDITIONS

The contractual conditions relating to the sale of Hazelwood Power Station and Mine to International Power (IPR) have not been tabled during the Panel process, nor has the Panel sought them, though the main aspects are reasonably clear. The Victorian Government had corporatised the Hazelwood Power Station and Mine under the name Hazelwood Power, which was then purchased by IPR for $2.4 billion in 1996. IPR later changed the name Hazelwood Power to International Power Hazelwood (IPRH). The sale included a mining licence which IPRH maintain held sufficient coal reserves to support the 40 year life of the business contemplated at the time of purchase (see also Section 8.4 above).

IPRH have spent nearly $500 million on progressive upgrades of the Hazelwood Power Station since 1996, aimed at improving the efficiency, performance, reliability and environmental performance of the facility. The Panel sought data from IPRH on the annual emissions/KWh, electricity sent out, coal volume used, total emissions, and saving from baseline year. In response, IPRH stated (IPRH#59) "It is not possible to compile a table in the manner requested by the Panel as the reporting requirements under the Greenhouse Challenge Program and the GES deed have changed over time and exact comparison to produce the publicly reported values is problematic." The following information was provided:

- CO_2 emissions are not measured directly, but are estimated based on the volume of coal consumed, and the CO_2 content of the in-situ brown coal;
- The measurement of the brown coal consumed is determined by topographic survey measures, which have an accuracy of ±2%;
- Coal from the Hazelwood Mine dries as it is excavated and conveyed to the power station. Experience and analysis has shown that coal will reduce in moisture by1% by the time it is delivered to and burnt in HPS (i.e. this equates to a reduction in mass of approximately 2.5%);
- The CO_2 content of the in-situ brown coal is determined by weekly analysis of coal samples taken from the raw coal bunkers. It varies depending on coal quality, but for 2002 it averaged 0.976 tonnes of CO_2 per tonne of raw in-situ coal;
- From the figures for 2002 in the 2003 Annual Report, the following values can be calculated (values quoted to three significant figures);

Coal volume used	(million tonnes)	17.2
Total emissions	(million tonnes CO_2-e (GES basis))	16.8

It might be noted that the Panel had some difficulty in understanding why a reduction in moisture content from 61% to 60% should equate to a reduction in mass of 2.5%. However if we define the percentage moisture of the wet coal as the ratio of the mass of water it contains divided by the total mass, and consider the drying of 100 grams of 61% wet coal, we first observe that the wet coal contains 39 grams of coal, and 61 grams of water. Driving off enough water to make the remainder have a 60% moisture content involves reducing the 61 grams of water to 58.5 grams, so that 58.5/(58.5 + 39) = 58.5/97.5 = 60%. In this drying process, the total mass is reduced to 97.5 grams, a reduction of 2.5%. The mass of the coal is, of course, not changed.

IPRH#55 cites on page 6 that in 2002, the emission intensity had reduced to 1.54 tonnes CO_2-e/ MWh sent out. By division, it would appear that the electricity sent out in 2002 was 10,900 GWh.

IPRH's 2003 Annual Report on the environment, health & safety and community 2003 reported in Table 6 Carbon dioxide emissions savings from actions taken by IPRH, and the table is reproduced below as Table 25.

Table 25 Carbon dioxide emissions savings from actions taken by International Power Hazelwood

Annual Abatement from Power Station Improvement's in Emission Intensity[1]	Annual Abatement[2] (t CO_2e/year)#	Accumulative Abatement (t CO_2e/year)#	Accumulative Abatement against a 1996 Base-line Year[3] (t CO_2e/year)#
Annual Abatement 1997	**446,031**	**446,031**	**446,031**
Annual Abatement 1998	**758,473**	**1,204,504**	**1,281,414**
Annual Abatement 1999	**-439,556**	**764,948**	**913,455**
Annual Abatement 2000	**535,723**	**1,300,671**	**1,425,948**
Annual Abatement 2001	**-235,516**	**1,065,154**	**1,263,522**
Annual Abatement 2002	**100,416**	**1,165,570**	**1,337,370**
Total Accumulative Abatement	**1,165,571**	**5,946,878**	**6,667,740**

Notes:

1 *Annual abatement is calculated as "Intensity (current year) – Intensity (previous year) # Electricity Sent out (current year)".*

2 *The Greenhouse intensity of the electricity sent out from the Hazelwood Power Station has reduced from 1.66 tonne CO_2e/MWh Sent Out in 1996 to 1.54 tonne CO_2e/MWh Sent Out in 2002. With increased production levels since 1996, the emissions offset through the reduction in greenhouse intensity each year compared to 1996 has been significant, with an offset in 2002 of approximately 1.3 million tonnes of CO_2e and a total offset over 6 years of approximately 6.7 million tonnes of CO_2e.*

3 *There will be interaction between some of the refurbishment actions such that the overall efficiency improvement saving may not be exactly the sum of the savings from the individual actions.*

Non-recoverable plant degradation of the above refurbishment actions will occur, to the extent that after a number of years, a proportion of the efficiency improvement will be lost.

The Panel notes that if the following nomenclature is used:

- E_{98} for the Electricity sent out in 1998
- I_{98} for the intensity of greenhouse emissions per unit of electricity sent out
- A_{98} for the Annual Abatement compared to the previous year
- B_{98} for the Annual Abatement compared to 1996

a series of equations of the form:

$A_{02} = -(I_{02}-I_{01})xE_{02}$ = 100,400 and $B_{02} = -(I_{02}-I_{96})xE_{02}$ = 1,337,000

can be constructed. Using these equations and other data given for I_{96} and E_{02} and I_{02} = in IPRH#59, the values shown in Table 26 below have been calculated. The Panel notes that these values may have a number of errors due to rounding, to the assumptions that have been made about the treatment of emissions from the mine, and to other factors. Nevertheless the calculated figures are consistent with the data in Table 25 above.

The Panel then constructed a table of the type requested from IPRH, and was able to achieve this to the extent shown in Table 26 below.

Table 26 Basic parameters for HPS and greenhouse gas emissions

Year	**Coal volume used** converted from total emissions	**Total emissions** from IPRH#59	**Total † emissions** product of next two columns	**Electricity sent out** calculated by Panel	**Emissions/ MWh** calculated by Panel
	million tonnes	million tonnes CO_2-e	million tonnes CO_2-e	GWh sent out	tonnes CO_2-e/ MWh sent out
1996	11.6	**11.3**			**1.66**
1997	14.9	**14.6**	14.0	8,700	1.612
1998	16.7	**16.3**	15.7	10,200	1.538
1999	18.0	**17.7**	17.0	10,800	1.578
2000	17.0	**16.6**	16.0	10,500	1.528
2001	**18.0**	**17.6**	17.2	11,080	1.549
2002	**17.2**	**16.9**	**16.8**	**10,900**	**1.54**
2003	**17.2**	16.9		11,000*	1.53
2004	**18.0** target	17.6		11,100* target	1.58
2005					1.53 target

Notes: Bold figures above denote data supplied by IPRH, rounded to three significant figures. As the data supplied included additional redundant data from the

perspective of the calculations undertaken by the Panel, variations of up to 4% in the results can occur depending on the particular data used.

* GWh sent out adjusted pro-rata to reconcile data for 2002 supplied in IPRH#55 with data in 2003 Annual Report Table 1 (which it is assumed includes internal power)

† The discrepancy between the values supplied by IPRH for the total emissions and the values obtained from multiplying the calculated power sent out, multiplied by the intensity of greenhouse emissions, provides an estimate of the robustness of the analysis.

The Panel provided IPRH with a copy of its calculations through Planning Panels Victoria, with a request that comment be provided. IPRH responded (see IPRH#64) that:

> *"Accordingly, IPRH notes that the methods used by the Panel to calculate emission intensity, electricity sent out and coal consumption have produced results that are not substantially inconsistent with actual data which, as stated above, is not publicly available information."*

IPRH went on to state that:

> *"due to the influence of these variables on IPRH's emissions profile it is problematic to extrapolate from past performance to predict future emissions scenarios to 2031. It is for these reasons that IPRH chose not to provide the requested data."*

In relation to future emissions, the Panel has no wish to extrapolate from past performance. Instead, it wishes to compare IPRH's estimates of future performance with existing performance. This is done in Sections 18.5 and 18.6 below.

What is apparent from the foregoing is that the Panel, using publicly available data, has calculated values for HPS greenhouse gas intensity for the years 1997 to 2003, data said by IPRH to be not publicly available. If the Panel is able to make these calculations, it is anticipated that any industry competitor or interested party can even more readily do so. The Panel has some difficulty in understanding why IPRH has regarded the information as "not public information" (see IPRH#64).

The information seems relatively innocuous, given that IPRH makes public its general operating parameters of about 17 Mt of coal mined annually for HPS, and the generation of about 11,000 MWh of sent out electricity annually. Apart from making sense of data that was presented in a very confusing manner, the only aspect that the Panel wished to review was the movement in the key parameter Emissions/ MWh expressed in tonnes CO_2-e/ MWh sent out. The Panel anticipated a steady decline in this figure, commensurate with the progressive expenditure of $500 million since 1996 in improvements to the efficiency of the plant. In fact, from Table 26 above, while the parameter dropped from 1.66 in 1996 to 1.54 in 1998, it does not appear to have improved significantly since then.

The issue of whether values of emission intensity, along with the other basic information of electricity sent out, coal mined and burned, and greenhouse gases emitted should be publicly available is addressed in the Panel's conclusions and recommendations at Sections 18.9.1 and 18.9.2 below.

18.5 IPRH'S PROPOSAL AND NEGOTIATIONS WITH GOVERNMENT

As has been mentioned above, IPRH believes that it has the right to mine the coal within Mining Licence 5004 and the right to seek one adjustment to its Mining Licence boundary. That latter right was exercised on 4 February 1999 (see Section 10.1.1) and the response from the Department of Primary Industry, and endorsed by the Minister, was positive (see section 8.4). IPRH do not consider the coal sought in the proposed Mining Licence to be "new coal", but simply "replacement coal" for coal which is difficult to mine using the block method, or otherwise presently inaccessible. IPRH see their proposal as swapping 110Mt of coal within the boundary of ML5004 for 92 Mt of coal outside the ML5004 boundary, a net reduction of coal.

IPRH believes that additional conditions imposed by Government that constrain their use of this "replacement coal", or any refusal to allow the HPS to operate beyond 2009, would constitute a significant issue of sovereign risk. While being unfair to IPRH, it would also send a strong negative signal to other potential investors in Victoria.

The Government has seen the request for a new Mining Licence for the coal outside ML5004 as "new coal", to which terms of the Brown Coal Tender process should apply.

EDO has argued on behalf of its clients that the entire coal volume requiring the Fifth Morwell River Diversion for access should be treated as "new coal", and should be subject to such strict greenhouse gas limits as would effectively close Hazelwood Power Station after 2009.

Justice Morris has determined that the greenhouse gases arising from the burning of brown coal from the mine, made accessible by the Fifth Morwell River Diversion, should be considered as an environmental effect that needs to be carefully considered.

Both IPRH and the Department of Infrastructure provided advice to the Panel Hearing about the broad terms of the "Deed" to be negotiated.

Mr Dave Quinn, the CEO of IPRH, prefaced his submission to the Panel on this issue with a precis of the actions IPRH has taken to comply with Government policies, and its belief that the Government's desire to negotiate further greenhouse gas emission reductions was outside IPRH's legal liabilities. Notwithstanding this, IPRH has entered into negotiation with the Victorian Government. He noted that the Victorian Government's intention is to apply Brown Coal Tender principles to 92 Mt of coal sought outside the current mining licence, even though that area was exempted from the tender area.

Mr Quinn was at pains to state that while IPRH would comply with any future emissions trading scheme that might be put in place, the market conditions were such that it could not unilaterally introduce new technology into the operations of HPS unless such initiatives were commercially proven (and would not put the HPS at risk technically), cost effective and funds were available to IPRH to make the investment. Mr Quinn stated that an emissions trading scheme would be a way of providing an economic incentive, across the board, for the introduction of new technology. In the absence of such incentives from Government, there was little inducement for IPRH to invest in greenhouse gas reduction technology when it was already meeting all government policies (and, it might be added, when market returns for electricity are so poor).

The Supplementary Information on Greenhouse Gas Emissions from HPS, IPRH#55, states:

> *While the precise details of these negotiations are confidential as between IPRH and the State, the following points provided an indication as to the current status of discussions, and the key points still being considered by the parties.*
>
> - *Negotiations between IPRH and the State have progressed to the point where there is now a draft Deed between IPRH and the State which provides, inter alia, for the reduction of greenhouse gas emissions from the HPS over a specified period of time. The parties are still negotiating in relation to the final format that any agreement will take.*
> - *At this point of time, the underlying objective is for IPRH to reduce its overall greenhouse gas emissions from an average of 1.54 tonnes of CO_2-e per MWh sent out (using a 2002 baseline figure) to an average of less than 1.46 tonnes of CO_2-e per MWh sent out. In terms of volume, the intended target reduction to be achieved by the end date of any final agreement is 25 million tonnes.*
> - *The extent and the means of achieving any greenhouse gas emission reductions from the HPS is still under active consideration between IPRH and the State.*
> - *The period within which IPRH's greenhouse gas emission reductions must be achieved is also still being negotiated between IPRH and the State, but it is likely to be over the life of the power station.*
> - *The interrelationship between the reduction targets agreed to by the State and IPRH, and any other greenhouse abatement schemes or emissions trading schemes that may later be introduced, is still being negotiated.*

The Department of Infrastructure, in its written and verbal presentations, was generally in agreement with the outline of the negotiations presented by IPRH. The DoI submission made a number of further points, including:

> *The Hazelwood power Station has the highest greenhouse intensity of the major Latrobe Valley power stations, reflecting its age. By comparison, the 2003 environment report for Loy Yang Power cited a greenhouse emission intensity of 1.23 tonnes of CO_2-e per MWh.*
>
> *The primary concern that has been raised about the West Field Project is that, by providing IPRH with access to coal that it is currently unable to mine, there will be a substantial increase in greenhouse emissions compared to the level that would occur were the project not to proceed.*
>
> *Some difficulties arise in assessing the change in emissions that the West Field Project would in fact produce. IPRH has indicated that mining operations would decrease from 2009 were the West Field Project not to proceed. It is not clear at what level the power station would operate after that year, which is central to any assessment of greenhouse emission increases.*
>
> *To the extent that Hazelwood Power Station's output is reduced after 2009, electricity demand would be supplied from other sources. It is reasonable to assume that replacement sources would have a lower emissions intensity than Hazelwood, but it is not clear how much lower it would be.*
>
> *The impact on greenhouse emissions arising from the West Field Project is therefore uncertain and could be only quantified by making significant assumptions about the response of governments and investors.*
>
> *The above discussion reinforces the Government's preference, summarised earlier, to regulate greenhouse emissions by a national measure covering the stationary energy*

sector, rather than by plant-specific limitations. It may be difficult for the Panel to establish an objective basis for such a limitation.

The Panel noted advice from DoI that the aim of the draft Deed was to reduce greenhouse gas emissions by 25Mt CO_2-e over the life of the HPS. This advice was clarified to some extent by IPRH's statement that the Deed would have a specific life (or period), and the savings would be achieved by reducing HPS overall greenhouse gas emissions from an average of 1.54 tonnes of CO_2-e per MWh sent out (using a 2002 baseline figure) to an average of less than 1.46 tonnes of CO_2-e per MWh sent out.

The Panel notes that the reduction from 1.54 to 1.46, a saving of 0.08 tonnes of CO_2-e per MWh sent out, applied to a notional 11,000 GWh per annum of electricity sent out, would take 28.4 years to achieve a 25 Mt CO_2-e saving. As we are only 26 years from 2031, to effect a saving of 25 Mt CO_2-e will require either greater average reduction in the emission intensity, or a longer period, or a greater annual output of electricity.

In terms of coal volume, the intended target reduction to be achieved by the end date of any final agreement is 25 million tonnes CO_2-e. As the amount of greenhouse gases emitted depends on the volume of coal consumed, and the life of the HPS could presumably be until the available coal is exhausted, it seems necessary to specify what the reduction means. If it is to be achieved, as indicated by IPRH, by reducing the emission intensity to 1.46 tonnes of CO_2-e per MWh sent out, then it would seem prudent to specify;

- the amount of coal that could be used to generate power over the period of the Deed;
- the average efficiency of generation (or the amount of energy to be sent out).

These two parameters define the average emissions intensity to be achieved.

Alternatively other parameters could be defined, such as the end date for the agreement, the total amount of greenhouse emissions over the life of the Deed, and the average intensity of greenhouse emissions over that period.

Unless some further clarity is given to what "a saving of 25 million tonnes CO_2-e" means, the Deed will be open to various interpretations.

A further consideration is the specification of conditions relating to any further coal accessible to IPRH within the mine and its extensions at the end of the period of the Deed.

No doubt such parameters will be detailed in the Deed. In their absence, the 25 Mt of CO_2-e savings in greenhouse gas emissions might well be compromised by the further emissions associated with the additional coal anticipated to be available as a result of the marginally better efficiency.

18.6 A POLICY APPROACH

In considering the potential savings of greenhouse gas emissions under various scenarios, the range of those scenarios might be considered to be:

- Business as usual at HPS;
- Reduced emissions as provided for in the draft Deed;
- Reduced emissions from HPS in conformity with existing policy;
- Reduced emissions if HPS were to close, and be replaced by black coal (electricity imports), open cycle gas turbine, combined cycle gas turbine, or by demand management efficiencies. For simplicity, a combination of replacement measures has not been given consideration.

While figures for most of these alternatives have been provided to the Panel, there has been little discussion of reduced emissions from HPS in strict conformity with existing policy. The policy framework is that provided by the PEM as it applies to existing power stations (best practice modifications which have a payback of 3 years), and the Brown Coal Tender conditions for "new" coal.

The coal resource beyond the present Morwell River Diversion contains some 347 million tonnes in total, of which 255 million tonnes is within ML 5004, and 92 million tonnes is within the proposed new mining licence.

Consider first the coal within Mining Licence 5004. Its use is subject to the PEM(GGEE), which although applying only for the years 2004–2006, is expected to be continued (until and unless it is combined within a consolidated new policy arrangement such as a broader national emissions trading scheme). It is by no means certain that achieving 5% reduction in the overall coal stream to the HPS boilers can be achieved without significant cost, although Mr Malcolm McIntosh appearing for the CRC for Cleanpower from Lignite, and Mr John Harrison of GTL Energy were optimistic that costs would be modest, and would be paid back by savings.

There is some indirect support for this proposition from IPRH, in that the 25 million tonne greenhouse gas reductions in the Deed are anticipated to be achieved with measures that include the use of coal drying technology. Mr Harrison told the Panel that agreement had been reached with IPRH to establish a formal project team staffed by both International Power and GTL Energy with the objective of installing a GTL Energy prototype coal upgrading unit at Hazelwood by the 4th quarter of 2005. The Pilot Plant trials anticipated a 5% reduction in greenhouse gas emissions using a blend of coal with a 55% moisture content. Independently, Mr McIntosh advised the Panel that the time scale for implementation of coal drying technologies is expected to be 2008–2010.

The 255 million tonnes of brown coal will produce 250 million tonnes of CO_2-e, and a 5% reduction would yield 12.5 Mt of CO_2-e savings for the same energy sent out (If the power station continued to send out 11,000 GWh per annum, the efficiency saving would increase the life of the coal resource by nearly three-quarters of a year).

Turning now to the coal in the proposed mining licence, some 92 million tonnes, to which the Brown Coal Tender policy is applicable. The limit set in HRL's Exploration Licence 4685 is

0.82 tonnes CO_2/MWh (or world's best practice at the time of the plant design finalisation). Compared to the present 1.54 tonnes CO_2/MWh from HPS, this would mean a reduction of 0.72 tonnes CO_2/MWh or a 47% reduction. 92 Million tonnes of brown coal will produce about 90 million tonnes of CO_2. A 47% reduction in greenhouse gas emissions would result in a saving of some 42.3 million tonnes of CO_2(while extending the life of the coal resource for a further 5 years).

In all, strict adherence to existing policy would yield some 55 million tonnes of CO_2 savings for the same sent out energy.

The range of greenhouse emission savings from the options postulated are summarised in Table 27 below.

Table 27 Potential greenhouse gas savings from options postulated

Option	Greenhouse gas saving— Mt CO_2-e	Reference
Business as usual	zero	
Draft Deed provisions	25	IPRH#55
Strict conformance to existing policy	55	See above
Replace HPS by black coal	133	IPRH#56
Replace HPS by open cycle gas turbine	222	IPRH#56
Replace HPS by combined cycle gas turbine	241	IPRH#56
Replace HPS by demand management efficiencies	340	Based on 347 Mt of coal producing 340 Mt CO_2-e (at 1.54 tonnes CO_2-e/ MWh sent out)

18.7 POTENTIAL IMPACTS FROM HPS GREENHOUSE EMISSIONS

The potential effect of various levels of greenhouse gas emissions from HPS, estimated by CSIRO, have been discussed in Section 13.3.2 above.

IPRH, and a number of industry submitters, have drawn attention to the very small increases in temperature that the emissions from HPS will make. The results reported by the CSIRO are discussed above in Section 13.3.2, with the comment that the increases are small, if taken in isolation to other emissions world wide.

In the submission by ACF (submission No 18 dated 20 January 2005), Mr Charles Berger put the temperature rise in different terms. Starting with the CSIRO figures of between 0.000043°C and 0.000128°C (associated with a 203 Mt reduction in emissions, the figure provided by IPRH to CSIRO for replacement of HPS by a combined cycle gas turbine, and different to the 241 Mt quoted in IPRH#56 and cited in Section 18.6 above), Mr Berger suggests that the value needs to be put in context.

He cites the CSIRO estimate of global warming of between 1.4°C and 5.8°C by 2100, relative to 1990 levels, and continues:

> *"Thus the decision to continue operating the Hazelwood facility rather than adopting available alternatives will be responsible for between 0.0022% and 0.0031% of global warming.*
>
> *"A 2001 report by global insurers, members of the United Nations Environment Program, estimated that the financial costs of global warming could be US$304 billion (AU$400 billion) annually. This, of course, can only be a very rough estimate, but it gives us at least an order-of-magnitude view of the possible costs of climate change.*
>
> *"If we multiply this estimated cost of global warming by IPRH's contribution through the continued operation of Hazelwood, we arrive at a figure between about AU$8,800,000 and AU$12,400,000 per year. This represents, very roughly, the current projected annual cost to the world's economy of not replacing Hazelwood by alternatives. Over the lifetime of the project, this means a cost to the world of about AU$260 million."*

The Panel notes that these "order-of-magnitude" calculations compare the higher and lower estimates of global temperature rise associated with the IPRH replacement scenario with the higher and lower estimates of total global temperature rise, respectively.

At the hearings, a representative of IPRH challenged two aspects of these calculations. Firstly, it was asserted that a discount rate of perhaps 8% should apply to calculation of a stream of future costs to present day values, reducing the $260 million to $99 million. Secondly, the cost should then be proportioned in relation to the savings in emissions from Victoria adopting CCCT generation compared to the world's emission, a factor given as roughly 0.18%. That would reduce the present value to approximately $180,000.

The Panel supports the first contention, as did Mr Berger. However the selection of an appropriate discount rate to represent society's preference can be controversial. A higher rate gives greater preference to the value in the early years of the series, while devaluing future costs. This can be seen as unfairly disadvantaging future generations. The current Government discount rate for major capital expenditure is understood to be 6%, though for long term environmental matters a lower figure is often taken. The impact of the emissions from HPS will not cease with the retirement of the plant, but will take many years to dissipate. Over a long term horizon, using a discount rate of 5%, the discounted value of a stream of annual costs of AU$10 million would be of the order of AU$200 million, this being an estimate of the cost to the world.

The Panel does not support the further proportioning suggested, which seems to be double counting. The potential HPS reductions have already been modelled as a contribution to world temperature rises, and the proportion of global warming factored into the calculations.

The Panel also considered a further question. Should costs to the world be the relevant costs, or should only costs to Australia, or Victoria, or the Latrobe Valley region be considered? The Panel views the world costs as the appropriate measure, and notes that IPRH itself favours consideration of the world market when considering the implementation of any ETS.

On 12 February 2005 Latrobe City Council emailed a revision to the CSIRO report (IPRH#63), based on revised data provided by IPRH. The data provided by IPRH looked at a range of replacement supply options were HPS to close at 2011, noting that the reference point for best practice emissions intensity for the initial modelling was 1.22 t CO_2-e/MWh, while the actual emission levels of HPS of 1.545 t CO_2-e/MWh was used for the revised estimates by CSIRO.

The CSIRO results were presented in four tables. Tables A1 and A2 revise Tables 2 and 3 in the original report. Tables AI and A2 have almost identical headings to those in Tables 2 and 3, save for nominating the closure date for HPS at 2011. Both original and revised tables use a reduction of 85 Mt and 203 Mt respectively, and show changes in global warming that are approximately 20% greater in the revised tables. The Panel notes that the increase is proportional to the difference in the emission intensities quoted in the paragraph above, but is unclear why that should apply if the modelling was undertaken on the basis of specified reductions in CO_2 emissions (of 85 and 203 Mt respectively).

Tables A3 and A4 show proportional increases in global climate change associated with a reduction in CO_2 emissions of 133 and 348 Mt respectively, these reductions being associated with abatements of replacement black coal, and replacement by energy efficiency. The Panel's confusion about the relevance of the HPS emission intensity rate referred to above is further illustrated by Table A4. If the emission saving of 348 million tonnes of CO_2 is based on replacing the total coal available for Phase 2 of the West Field development with demand management efficiencies, what is the relevance of the IPRH reference level?

18.8 DISCUSSION

While Table 27 above gives some appreciation of the range of savings under various scenarios, it does draw attention to the difference between the draft Deed provisions and the "Strict conformance to existing policy". There appear to be a number of factors that militate against achieving that saving of 55 Mt CO_2-e suggested by the Panel as flowing from strict conformance to existing policy. These factors include:

- IPRH's view of the 1996 terms of sale, and their right to anticipate free access to sufficient coal for 40 years of operation of HPS;
- whether the exclusion of the proposed IPRH mining licence area from the Brown Coal Tender process removed it from the application of the greenhouse gas emission policy associated with the tender and licence conditions;
- whether coal drying is able to be implemented within the 3 year return regime of the PEM(GGEE);
- whether, in taking a hard line, the government would be exposed to industry perception of increased sovereign risk (the risk that a government might make changes to the law that contradict the reasonable expectations of industry, based on previous government assurances);
- whether the setting of tighter greenhouse gas emission limits might lead to the closure of HPS, and attendant economic and social impacts.

A further factor was put eloquently by Mr Dave Quinn, in discussing the particular suitability of HPS, with its eight smaller units of 200–220 MW capacity each, for use in piloting technology improvements. If IPRH was to be penalised (through tighter emission requirements) for the technology development it was pioneering, what then would be the incentive for further investment in such research, development and commercialisation?

While some reasons have been presented above to lower any expectation that savings of 55 Mt CO_2-e suggested by the Panel under the heading "Strict conformance to existing policy" might be realistically expected, it should be stated that there are also reasons why savings in excess of 55 Mt CO_2-e may be possible. As the "existing" brown coal will supply the power station to 2026 (a notional year based on volume, not the particular mining sequence favoured

by IPRH), it might be expected that there will be a number of additional technical advances that can be implemented in the next 20 years that have a 3 year pay-back period.

Concerning the "new" coal, it will be required after 2026, at which time the greenhouse gas target of at least 0.82 tonnes CO_2/MWh sent out may be considered to be of only historical interest, in the light of the tighter standards that may be required at that future time.

The Panel is very conscious of the high degree of interest from the mining and power industries concerning the conditions under which the government will permit the relocation of the Morwell River and the approval of a new mining licence. From the submissions made it is clear that industry views the current approval process as something of a test case, and sees an outcome favourable to its views as essential to the maintenance of Victoria's reputation for having negligible sovereign risk.

Similarly, the Panel is very conscious of the views of those who have argued against the continued operation of HPS because of concerns about its high emissions of greenhouse gases.

Clearly there are different views concerning the policy settings that apply to HPS and mine. The Panel believes that in the circumstances a negotiated outcome is appropriate. The general terms of the Deed, as made known to the Panel, appear to provide a reasonable way forward in the short term. In the medium to long term, an emissions trading scheme that has broad application is seen by most parties as providing an efficient market mechanism for regulating greenhouse gases in the future.

The Panel's principal concern is that the final terms of the Deed should not constrain the achievement of an efficient and equitable ETS. While it is too early to know just how any ETS scheme will be set up, the discussion at the Panel Hearing has highlighted how important the detail of any ETS will be to an effective scheme. While IPRH has stated that it is prepared to work under any National ETS scheme (i.e. a level playing field), Mr Dave Quinn has also advised that IPRH will negotiate for total grandfathering rights.

The Panel would be very concerned if the Deed were completed in such a way that the government had no flexibility in either setting the parameters for HPS in a future ETS, or changing those parameters in the light of experience.

A second concern of the Panel is that the future of the PEM(GGEE) program beyond 2006 is not known (see Section 18.3 above). In the absence of any comprehensive ETS, the Panel considers it essential for the Victorian Government to commit to the continuation of the PEM, and its associated Action Plans, and for the Deed to clarify that conformance with the PEM is required (in addition to the specific reduction in greenhouse gases specified).

The Panel accepts that an order-of-magnitude estimate of the cost of the impacts of greenhouse gas emissions from HPS over the period 2011 to 2031 (and the effect of those gases in the global ecosystem for many years after that) compared to replacing HPS with a more greenhouse friendly option, might be of the order of $200 million. While this is a very significant sum, it must also be seen in the context of a $3 billion investment by IPRH, and the other environmental, social and economic implications of the proposal discussed elsewhere in the report.

18.9 CONCLUSIONS AND RECOMMENDATIONS

18.9.1 CONCLUSIONS ON GREENHOUSE GAS EMISSIONS FROM HPS

The Panel accepts that an order-of-magnitude estimate of the discounted financial cost of the impacts of greenhouse gas emissions from HPS over the period 2011 to 2031 (and the effect of those gases in the global ecosystem for many years after that) compared to replacing HPS with a more greenhouse friendly option, might be of the order of $200 million (as estimated in Section 18.7 above).

Views relating to conditions of sale of HPS to IPR, the uncertainty of whether potential replacements to HPS would yield significant greenhouse advantages in the short to medium term, considerations of sovereign risk, and the likelihood of an emissions trading scheme being implemented at a national level in the medium term, differ substantially. The voluntary agreement between IPRH and government (the Deed) outlined in broad terms to the Panel appears to provide a reasonable way forward in the short term, and is supported by the Panel. Whether 25 Mt CO_2-e emissions savings or some other value is set in the Deed, the CO_2 emissions are directly proportional to the amount of coal burned. It will be essential for the Deed to specify parameters such as the amount of coal that can be used to generate power over the period of the Deed and the average efficiency of generation and the amount of energy to be sent out.

In addition, the setting of future conditions relating to any further coal accessible to IPRH within the mine and its extensions at the end of the period of the Deed should be allowed for.

The Panel would be very concerned if the Deed were completed in such a way that the government had no flexibility in either setting the entry parameters for HPS in a future ETS, or changing those parameters in the light of experience.

In the absence of any comprehensive ETS, continued implementation of the PEM(GGEE) beyond 2006 is seen as essential. The Deed should clarify that the requirements of the PEM(GGEE) and the associated IPRH Action Plans beyond 2006 are additional requirements to the greenhouse gas emissions savings specified.

Monitoring and reporting to improve the current fragmentation and confusion of greenhouse gas reporting, and to clearly report annually the amount of coal used, the average efficiency of generation, the amount of energy sent out, and the average emissions intensity achieved, should be required. To provide for better accountability such requirements should be included in the PEMP and IPRH's annual reports to the community.

18.9.2 RECOMMENDATIONS ON GREENHOUSE GAS EMISSIONS FROM HPS

The Panel recommends that:

- **the broad outline of the Deed relating to future greenhouse gas emissions from the burning of coal from the proposed mining licence area provides a reasonable way forward in the short term, provided its detailed terms provide clarity about the savings to be achieved, and flexibility for the government to set entry parameters for HPS in any future ETS, and to vary those parameters in the light of experience;**
- **Government provide assurance that the PEM(GGEE) and its associated Action Plans will continue beyond 2006. The Deed should also provide, in the absence of any comprehensive ETS, that the requirements of the PEM(GGEE) and the associated IPRH Action Plans beyond 2006 are additional requirements to the greenhouse gas emissions savings specified;**
- **monitoring and reporting to improve the current fragmentation of greenhouse gas reporting, and to clearly report annually the amount of coal used, the average efficiency of generation, the amount of energy sent out, and the average emissions intensity achieved, should be required. To provide for better accountability such requirements should be included in the PEMP and IPRH's annual reports to the community.**

19. OTHER SOCIAL ISSUES

19.1 INTRODUCTION

- A wide range of social issues was considered in the EES. The main reference is EES chapter 11: Social Impact Assessment. The Panel has confined its review of other social issues in this chapter to the following matters: Landscape and visual impacts (EES 11.4 and Supporting Study 15 by EDAW Gillespies).
- Aboriginal and non-Aboriginal cultural heritage (EES 11.6 and 11.7, Supporting Study 16 by Perspectives Pty Ltd).
- Impacts on the community (EES 11.9 and Supporting Study 17 by Sinclair Knight Merz).

Other social key issues have been discussed elsewhere in this report (air quality and health in Chapter 15, noise in chapter 16, and roads and traffic in chapter 12). The full range of social issues identified in the EES assessment Guidelines issued by DSE (Attachment 1 to the EES) has been covered by the EES and the supporting work.

19.2 LANDSCAPE VALUES

19.2.1 EXISTING CONDITIONS

The Latrobe Valley has a predominantly rural landscape dominated visually by the power industry infrastructure of the Hazelwood, Loy Yang and Morwell power stations, related open cut mines, associated high voltage power lines, roads, workshops and cooling towers and ponds and the towns that service the sub-region.

Within the immediate study area, the predominant landscape units are the Morwell River and its tributaries, Hazelwood South with the cemetery hill that separates the open cut mine from the very significant pondage, valley pastoral areas to the west and south, the Haunted Hills that provide a modified wooded backdrop to the west with plantation trees on the lower eastern slopes, the Morwell township to the north-east of the mine and the Hazelwood mine and massive open cut.

19.2.2 VISUAL ASSESSMENT

A visual assessment was carried out by considering the possible impact of the mine extension on the outlook from sensitive land uses such as dwellings, recreation areas, major roads and places of environmental, cultural and social significance (e.g. Hazelwood Cemetery).

Potential major intrusions include:

- the Strzelecki Highway deviation, which will modify the landscape as seen from a number of houses. A review of the vertical alignment has been recommended as an outcome of Chapter 12 of this report, to provide a lowering of the grade-line to marginally reduce the potential impact;
- the Morwell River Diversion 5 will cause a significant visual impact during its 3-year construction program but, following the proposed revegetation, it will ultimately become an asset to the landscape;
- the spoil mounds will be the most intrusive elements into the landscape but with careful shaping and planting, they will provide a reasonable screen to the mining activities (and the power station);
- clearing ahead of the mine operations and the operation of the mine itself will be visible to views from elevated (but mostly distant) positions. From intermediate positions (nearby farm-houses etc, the mine operation will be shielded by the spoil mounds. Because of its sunken nature, the mine is unlikely to be visible from nearby locations;
- the existing 220-kV transmission line is conspicuous in its rural setting and will remain so when it is relocated.

Although the mine and its associated works are seen as a potential negative impact on the landscape, it is never the less considered by some as a major point of interest. For this reason, it was suggested, in Chapter 12, that provision be considered for a parking bay on the highway deviation at a location where the river diversion and the mine extension could both be viewed.

The mine implementation process proposed by IPRH indicated that the spoil mounds will be compacted and shaped to final land-form and revegetated with grass and scattered trees and understorey vegetation to match the landscape of the valley floor and along side the waterways and wetlands.

19.2.3 LANDSCAPE RESIDUAL ASSESSMENT

The visual character of the landscape of the Latrobe Valley in the coal extraction sub-region (around the open cut mines and power stations of Yallourn, Hazelwood and Loy Yang) is changing as maturing shelterbelt and plantation shorten or block long-range views to the mines and power generation infrastructure. The proposed plantings along the highway and river diversions and the vegetation of the spoil mounds is designed to continue this trend.

Some viewing areas are sensitive to the mine extension and will, as a result be likely to suffer adverse impacts during the construction process and immediately after until the proposed plantings take effect. However, amelioration is expected to improve these initial impacts to the point where visual impacts are likely to drop to low in most cases. The most sensitive sites have been identified as follows (see table 11.7 in the EES):

- residences west of Strzelecki Highway (Golden Gully, Walsh and Gibsons Roads): High initial impact, low long term impact (after amelioration is complete);
- Strzelecki Highway south-west of the West Field Mine extension: High initial impact, low long term impact;
- Hazelwood Cemetery: High initial impact, low to medium long-term impact.

19.2.4 CONCLUSIONS ON LANDSCAPE VALUES

The works to implement the proposed river and road diversions and the West Field Mine extension have the potential for major intrusion on the landscape. However, the Panel concludes that IPRH have taken reasonable steps to ameliorate and manage these impacts during the river and road construction processes and to minimise the visual intrusion of the mine to an acceptable level.

To ensure this amelioration is implemented, the measures proposed must be included in the Project Environmental Management Plan.

19.3 CULTURAL HERITAGE

19.3.1 ABORIGINAL CULTURAL HERITAGE

Prior to initial European settlement, the traditional owners of the Gippsland region from the Tarwin River to the Snowy River were the Kurnia, a group of about 4 - 5,000 people, descendants of whom still live in the area today. Many place names in the area are of Aboriginal origin.

Events and activities over the years since European settlement have seriously disturbed evidence of pre or post contact Aboriginal occupation of the study area. The Site Register at Aboriginals Affairs Victoria records 120 archaeological sites within and adjacent to the study area. About 50% of these were found on fans and slopes of the Haunted Hills to the west of the study area and more than 25% on low alluvial terraces.

Within the immediate vicinity of the proposed works, there are 11 known sites within or adjacent to the proposed mine development area, 5 sites in or adjacent to the river and roads deviation area but none within or near the Eel Hole and Wilderness Creek diversion areas. Individually, these sites were considered to be of low scientific significance, being of limited content and highly disturbed. However, the density of sites and their relationship to the landscape means that, as a group, they are of moderate scientific significance. All are considered to be of high cultural significance to the Aboriginal people. It should be noted that while there are six known highly significant places within the Latrobe Valley on the Aboriginal Historic Places Database, none are in the study area.

While none of the sites within the immediate vicinity of construction sites are so significant as to constrain the location of the project, sites affected will need to be clearly identified and defined and appropriate protocols put in place to monitor any disturbance. The necessary steps include:

- managing known sites by carrying out appropriate subsurface testing, consulting with representatives of the local Aboriginal community, obtaining 'consent to disturb' permits and mange the actual works in accordance with the permit (site investigation, record, salvage, storage and lodgement of information);
- identifying new sites by conducting detailed on-ground surveys, identifying and investigating sites of potential and reviewing other sites of limited potential;
- managing new sites by ceasing work if artefacts are discovered then implementing the same measures as for known sites;
- maintaining a close working relationship with representatives of the local Aboriginal community from well before the commencement of work and during all road and river construction works and the removal of overburden from the mine site.

19.3.2 ABORIGINAL HERITAGE CONCLUSIONS

To ensure the proper protocols relating to Aboriginal sites are followed, these should be included in the Project Environmental Management Plan.

19.3.3 NON-ABORIGINAL HERITAGE

A number of known or potential non-Aboriginal historic places have been recorded in or near the study area. Most are farmhouses and related structures associated with a small number of families, several of which have been established in the area for several generations.

There are four known sites in or adjacent to the West Field mine development. Three would be directly impacted — a late 19th century structure with artefacts and exotic trees, another with exotic trees and potential unidentified ruins and a mid 20th century building site. The fourth is the 'Merton Rush" homestead within 100m of a spoil stockpile. There are also 18 potential sites that would be impacted. These include sixteen potential farm dwelling or related ruins from the late19th century - 1930's era, several with exotic planting. There is also a water crossing and a water control structure.

No known sites are impacted by the Fifth Morwell River and related creek diversions and the Strzelecki Highway deviations. There are ten potential sites including six dwellings, a school site from the 1880's, a timber shearing shed, unidentified ruins and an early 1920's building.

The heritage places in the study area are of low significance individually, but the complex of places is likely to be of local significance because they reflect the history of a spatially discreet, small rural community.

An archaeologist will investigate all the sites within the impact area and sites, places and structures older than 50 years and of state significance will be placed on the Heritage Register. All sites, regardless of their significance will be recorded in the Heritage Inventory to provide statutory protection. IPRH will require a 'permit' from Heritage Victoria to disturb a site on the Heritage Register and a 'consent' to disturb a site on the Heritage Inventory.

19.3.4 NON-ABORIGINAL HERITAGE CONCLUSIONS

While it is acknowledged that the heritage places in the study area are of low significance individually, the proper protocols for classifying each site

and for obtaining the necessary permits or consents should be included in the Project Environmental Management Plan.

19.4 IMPACTS ON THE COMMUNITY

19.4.1 IMPACT DUE TO PROPERTY ACQUISITION

The extension of the mine and the building of the river and road diversions will require the acquisition of some 782 ha, mostly under diary or beef cattle, for a loss of agricultural production of the order of $2.3 million over 30 years. (The value of land for power generation is two orders of magnitude greater and this has been recognised in State and Local Planning Policies).

The small community living within the proposed works area will suffer personal emotional loss from their migration from the area. A number of the sixteen households impacted have lived in the area for more than one generation and expressed regret at the need to move but accept that the project cannot proceed without their relocation. IPRH are working closely with all sixteen households to keep them informed and have sought to negotiate with all landholders and to ensure that they are compensated fairly for the sale of their property.

IPRH has also indicated a willingness to compensate the local community for the loss of community facilities at Driffield by working with the appropriate agencies (CFA to relocate the fire-station and the Latrobe City Council regarding the tennis courts and hall).

19.4.2 REGIONAL COMMUNITY IMPACTS

The Latrobe Valley remains economically disadvantaged relative to other parts of the state. This is demonstrated by a number of comparative economic indicators discussed in the EES and Supporting Study 17. The relative state of economic hardship has made the region more sensitive to shifts in employment, particularly because of the privatisation of the SECV in the late 1980's, which had a significant impact on the Valley community. Changes to the operation of the still predominant electricity generation industry need to be viewed in this context.

The submission on behalf of the Gippsland Trades and Labour Council articulated a number of the problems which residents in the Valley had had to contend with over the last two decades, including:

- declining jobs in the utility sector (from 6,000 in 1986 to 1,500 in 2001);
- declining population (8,000 to 7,400) over the same timeframe;
- the highest level of gambling in regional Victoria;
- 3.3 times the state average for asbestos related cancer, with the attendant emotional and financial burden;
- the fire and closure of Energy Brix (it should be noted that this plant has now re-opened);
- a finding by the Productivity Commission that the public benefits of the electricity reforms were not felt in Gippsland.

If the river and road deviations were not to proceed, then coal resources accessible under the current mining licence will be exhausted in 2009. This would result in the loss (mostly in Morwell) of about 500 jobs directly related to the mine with the consequential flow-on into other local, power related and service businesses. Table 11.19 in the EES estimates a total potential job loss of 800 if the mine and power station close in 2009.

If the mine extension does proceed, the scale and nature of the development are likely to generate some $300m (present value at 4% discount) (see SKM Supporting Study 17) of which 58% (or $173 M) would be spent within the City of Latrobe. The economic climate within the Latrobe Valley is likely to benefit from the introduction of more efficient coal driven electricity generation in the long term (see chapters 7 and 8 of this report). The continuing use of the Hazelwood Power Station (subject to agreement on modifications to reduce greenhouse gas emissions, a topic beyond the terms of reference of the EES) as an interim measure would enable the Morwell community to remain buoyant over the next two decades.

Although alternative views on ongoing employment opportunities were put to the Panel (EDO argued that alternative power sources would provide sufficient replacement jobs), there was not a conclusive argument that alternative jobs would be likely to locate in the Latrobe Valley.

The Panel notes (in Section 4.1 of this report) that most of the written submissions to the EES (about 560 out of a total of 567) listed retention of jobs by continuing to mine at Hazelwood as the key factor in their support of the project. This is a clear indication of the wider community view of the project and its contribution to the economic well being of the Latrobe Valley community.

19.4.3 CONCLUSIONS ON COMMUNITY IMPACTS

Retention of jobs by the extension of the Hazelwood mine is a clear community priority.

Closure of the Hazelwood power station and mine complex in 2009 would be likely to create a high level of unemployment in the Latrobe Valley. Sufficient time is required to develop alternative brown coal to electricity generation to enable the workforce to remain relatively constant.

IPRH is acting in a responsible manner in its dealings with the directly impacted local community. The Panel notes that the Work Authority required under the MRD Act contains requirements for consent and compensation arrangements. With respect to compensation or replacement of public facilities, the Panel would anticipate that IPRH would conclude formal agreements with the Council and the CFA, and these agreements would satisfy the requirements of the Work Authority.

19.5 RECOMMENDATIONS ON OTHER SOCIAL ISSUES

The Panel recommends that;

- **any planning permit for the construction of the Morwell River Diversion and the diversions of its tributaries and for the Strzelecki Highway deviation should contain conditions to ensure:**
  - **the agreed landscape amelioration works are implemented to the required standard;**
  - **the proper protocols are implemented according to Aboriginal Affairs Victoria procedures for known and potential Aboriginal heritage sites;**
  - **the proper protocols are implemented according to Heritage Victoria procedures for known and potential non-Aboriginal sites;**
- **the matters listed above should be referred to in the PEMP, and the mine work plan; and**
- **formal agreements with the Council and the CFA for the compensation or replacement of public facilities should be finalised, and the Work Authority under the MRD Act should require these agreements.**

20. MINE CLOSURE AND REHABILITATION

20.1 MINE CLOSURE OBJECTIVES

An inevitable consequence of a major open cut mining development is the creation a large void. The more enlightened attitude to the rehabilitation of a mining void that now exists requires that consideration be given to mine closure and rehabilitation well in advance of the cessation of mining. The current reality is that planning mine closure and rehabilitation plans are now considered prior to the commencement of mining. This includes the lodging of a financial bond of sufficient size to cover the reasonable costs of the government having to assume responsibility for the implementation of the rehabilitation plan.

Chapter 8 of the EES discusses the mine closure and rehabilitation in considerable detail. There is no Supporting Study dealing directly with either mine closure or rehabilitation.

Requirements for mine closure, and especially for rehabilitation, exist at both Commonwealth and State levels. Objective 5.1 of the National Strategy for Ecological Sustainable Development states:

> *"….. to ensure mine sites are rehabilitated to sound environmental and safety standards and to a level at least consistent with the condition of the surrounding land."*

More specific requirements are included in the Victorian Mineral Resources Development Act 1990, which requires that the rehabilitation plan must take account of:

- any special characteristics of the land;
- the surrounding environment;
- the need to stabilise the land;
- the desirability or otherwise of returning agricultural land to a state that is or as close as is reasonably possible to its state before the mining licence was granted;
- any potential long-term degradation of the environment.

In the EES the proponent addresses each of the above requirements and provides specific information about how they apply to the Hazelwood mine site.

The land on which the Hazelwood mine exists does have special characteristics, especially the existence of the below ground surface deep coal seam (Morwell 1 seam) and the deeper highly pressurised aquifers (Morwell or M1 aquifer and the Traralgon or M2 aquifer). The effects of the aquifers on the safety of the mine are critical to the operation of the mine. The maintenance of the integrity of the aquifers and their potential future uses are important issues in the mine closure and its rehabilitation.

The surrounding environment is typical of the land in the Morwell River Valley and floodplain, an area that has been used for farming activities (mainly grazing) for well over 100 years. Considerable infrastructure exists close to the mine, including the Morwell Township, industrial developments, power stations, major roads and railway line. There are relatively

limited areas of remnant vegetation, mainly occurring along road reserves and watercourses and as isolated pockets, especially associated with drainage lines.

Stability of the land is a major issue and includes the stability of the void due to pressures within the aquifers. It also includes the stability of the coal batters due to groundwater pressures in the vertical and horizontal jointing in the coal. The assessment and management of the pressures in the aquifers raise serious questions about ensuring stability of the mine site and the surrounding land. On a wider geographic scale, the existence of the Hazelwood mine void together with the voids of other mines in the area are important to the geological stability of the Morwell Township and the associated infrastructure mentioned above. The ultimate long-term aim for the mine after mining ceases includes the long-term stability of the land in and around the mine site and also within a few kilometres of the mine.

Returning the land to its pre-existing use as quality agricultural land is unlikely to be feasible. The deep void [RL - 70 metres (70 metres below sea level) to RL – 100 metres (100 metres below sea level)] together with the effects of the aquifers and the limited availability of topsoil all indicate that the mine area will not become agricultural land.

The potential for long-term degradation of the environment will depend on the actions taken as part of the rehabilitation process. For example, instability of the mine could impact on the local surface and subsurface drainage systems. The mine could also be a source of dust unless the revegetation is successful. Unless the risk of fire from the ignition and subsequent slow combustion of coal remaining within the mine void are minimised, smoke could be a significant nuisance. An extreme possibility of an off-site effect is the escape of a fire in the mine area into surrounding land.

20.1.1 MINE CLOSURE

If IPRH's mining lease is extended and the West Field Project is approved, the Hazelwood mine will continue in operation until 2031, but coal mining will commence declining in 2029.

IPRH demonstrated to the Panel that there are important decisions yet to be made about future mining of the West Field. There are two possible development options for the West Field involving different orders in which the Blocks would be mined. The sequence of mining the blocks in the two options is shown below.

- First option – Blocks mined in order of 1a, 1b, 1c, 2a, 2b and finally Block 3;
- Second option – Blocks mined in order 1a, 1b, 1c, 3, 2a and finally Block 2b.

The decision on the preferred sequence for the mine development in the West Field must be made no later than 2010.

IPRH advised the Panel that the benches and ramps are essential for the mining methods used at Hazelwood and that these were required until the mining was completed at any level along a coalface. In addition much of the existing ramp system would be required until the completion of mining, e.g. dredger access ramps along the northern batters to enable dredges to move from one level to another, ramps to transport overburden from the development of the West Field to the internal overburden dumps at the bottom of the mine. Similarly, the conveyor systems would require benches and ramps to deliver coal to the raw coalbunker and to deliver overburden to the stacker operating in the internal overburden dumps.

IPRH also advised the Panel that the sequence of mining mentioned above would have little impact on the location of the required ramps. This means that mining operations will unavoidably constrain efforts by the proponent to embark on a large-scale program of progressive rehabilitation of the mine. Consequently much of the rehabilitation cannot be undertaken for many years yet.

Another influence on the closure of the mine is that some of the existing infrastructure within the mine void would need to remain in operation until the mine closure. This includes the dewatering ponds, various pipelines and pumps and the aquifer pumps. The aquifer pumps would not only remain in operation until the mine closed but would continue in operation for at least 6 years after the cessation of mining.

20.2 REHABILITATION AND MINE STABILITY

The previous rehabilitation plan for the mine developed by Generation Victoria in 1994 was for the mine void to be flooded. In a general sense, this overall view of the rehabilitation has not changed and IPRH intends that some form of water body will be a dominant feature of the rehabilitation plan. However the current task is to carefully assess the current information and to seek to understand the processes that will lead to a sustainable but highly modified ecosystem for the rehabilitated mine.

The proponent has emphasised in the EES and in the Panel presentations that the rehabilitation of the mined area is complex and requires further consideration. As a result, the proponent is of the view that the only valid rehabilitation plan that can be provided to the DPI at this time is one that is more conceptual in nature rather than definite and detailed. The fundamental problem preventing the preparation of a final rehabilitation plan is mine stability. This is primarily a problem due to groundwater and can for convenience be considered in two parts – aquifer pressures and batter stability.

20.2.1 AQUIFER PRESSURES

The aquifer pressures in the Morwell or M1 aquifer and the Traralgon or M2 aquifer (the deeper aquifer) under the mine site are substantial. The potential for ingress of substantial volumes of water from the aquifers entering through the floor of the mine has produced the need for continuous pumping of groundwater from these aquifers. By reducing the pressures in the aquifers, the mine is made safe from mine floor heave, which if unchecked, could have catastrophic effects on the mine floor and on the stability of the surrounding, elevated batters. As the mining reaches the lower levels of the coal seam, the pressure from the weight of coal and overburden originally in place, is correspondingly reduced. Consequently continued pumping of the aquifers is necessary to further lower the piezometric head in the aquifers.

Pumping of groundwater from the aquifers commenced at the Hazelwood mine in 1961 and of necessity will continue while mining continues until 2031. Furthermore pumping from the aquifers will need to continue for some years after mine closure, as discussed below.

The Panel was advised that mining at Hazelwood has so far removed 600 million tonnes of overburden and coal (about 80% being coal). Further removal of overburden and coal will occur from the development of mining in the West Field. To balance the pressure of water

from the aquifers, the proponent has undertaken a number of studies to assess how much downward pressure is likely to be needed and how the downward pressure might be obtained.

The current estimation of the minimum weight that will be required to balance the aquifer pressures at the end of mining is about 280 million tonnes.

The EES quotes (page 8-5) that the about 180 million tonnes of overburden will be produced from the West Field and it will be deposited in the internal overburden dumps. Possible sources of the additional 100 million tonnes of overburden required to meet the 280 million tonnes are discussed in the EES. Although this amount of overburden is probably available from the external overburden dump, the cost of a truck and shovel operation to move it into the mine has been estimated at $560 million and it would take 12 years to complete the task. Due to the cost, this sourcing of overburden is considered to be uneconomic.

The additional weight required to balance the aquifer pressures could be obtained from the use of water to make the void a permanent lake. However the use of water, which is less dense than overburden, means that a greater volume of water will be needed than the volume of overburden. To obtain the required amount of water, aquifer pumping at the present rate of approximately 20 million litres per year would need to continue for about 6 years. Another source of water to assist filling of the void would be effluent from a sewerage treatment plant if such water were available.

Based on a water balance study carried out for IPRH, the use of both overburden and water to partially fill the void to balance the aquifer pressures would require an equilibrium water level of at least – 22 metres (22 metres below sea level). This study concluded that the void would gradually increase in level over a 500-year period to reach a hydrological equilibrium at RL + 8 metres. This is quoted in the EES to be a water depth in the mine of 60 metres to 80 metres leaving 40 metres to 50 metres of coal batters exposed. Figure 29 illustrates the expected development of the mine lake over the extended time period.

The mine lake would also receive rainfall over its surface area (annual average rainfall in the area is 860 mm) but would lose water through evaporation. The lake could also receive surface drainage from the surrounding area but this could have an impact on water quality in the void. However the diversion of these surface waters into the mine could also reduce drainage flows into the local watercourses and this would be seen as a negative impact.

The aquifer pressures have become more complex due to human activities in the area. The Morwell and Traralgon aquifers were considered to be confined aquifers and hydraulically isolated from each other, i.e. there was an impervious layer between them, an impervious layer above the Morwell aquifer and an impervious below the Traralgon aquifer. However through the effects of activities in the area - and presumably mining is the activity with the greatest effects - the two aquifers are now considered to be hydraulically connected although the degree of connectivity is not specifically known. The Loy Yang mine also pumps water from the aquifers but Yallourn mine is a shallower mine and does not have to pump water from the aquifers. Other groundwater users exist throughout the area and this is demonstrated by the existence of numerous extraction bores in the region.

The hydraulic connection between the two aquifers is almost certainly complex and is likely to occur in the area of the Hazelwood mine (and possibly in the area of the Loy Yang mine as well) but it may also exist on a much wider geographic scale. Therefore aquifer pressure is not an issue that is specifically related only to the activities of IPRH but is in fact a regional

issue and any actions by IPRH need to be considered as a part of a regional response to the issue.

Figure 29 Water balance post mine closure

In one of the presentations to the Panel, a member of the proponent's team put the matter of aquifer pressures into perspective when he stated:

> *"These matters are of critical importance in achieving 'stable' closure and must be resolved as a priority. They require time, money and co-operation to resolve."*

The Panel fully agrees with the level of importance that the proponent places on these important but unresolved issues. The Panel understands the dilemma that this creates. While the proponent needs to provide a mine closure and rehabilitation plan for the mine, it is clearly not feasible to provide a complete or final rehabilitation plan to the DPI as part of the Works Authority approval process. It is therefore not surprising that the proponent would prefer to provide a conceptual rehabilitation plan that is subject to modification as further information on these issues emerges.

20.2.2 BATTER STABILITY

Batter stability is primarily a problem associated with water pressure – water pressure within the vertical and horizontal jointing between the blocks of coal. This water is also aquifer groundwater but is not water from the deep, largely confined aquifers, discussed above. This water is from the normal groundwater that exists below ground surface at varying depths, depending on the geology of the area. In the Hazelwood mine the groundwater intersects the coal and extends down and through the coal, especially in the existing joints between the coal blocks.

If this water pressure is not relieved, there is the potential for the coal blocks to move relative to each other. This can (and has) produced catastrophic collapses of blocks of coal into the adjacent mined out areas.

To relieve the water pressure within the coal joints, a series of 100 mm bore holes is drilled horizontally into the coal face at places where cracks, fractures and joints are known to exist in the coal. The boreholes intersect the joints in the coal and allow the free discharge of water into the mine. The last 6 metres of the boreholes are cased to prevent the exit from becoming blocked.

The existence of numerous bore holes that will remain after the cessation of mining will be important for the continued stability of the final coal batters above the ultimate water level in the void.

In its original submission on the EES, the DPI agreed with the proponent's view about the importance of batter stability:

> *" …. batter stability is the core of the rehabilitation of the pit. Without stable mine faces, their inevitable failure makes redundant any debate about revegetation, protection of public safety, and the capacity to fight fires."*

Four options for treating the coal batters for the rehabilitation of the mine were considered by the proponent and are briefly described in the EES section 8.3.3:

- untreated batters – the batters will gradually erode over time and slump to a more even slope. Self-sown vegetation would become established on the batters above the water level, as has already occurred with some of the older batters in the mine;

- dozing down batters – bulldozers would be used to flatten the batters to an overall evenly flatter slope. Although the batters below the water line would be stable, rock beaching may need to be installed at the water line to prevent erosion from wave action. If overburden were to be placed on the flattened batters above the water line, it would need to be compacted on steeper slopes and near the water line to prevent erosion and to enable vegetation to become established;
- constructing flatter batters (to say 1V:6H) – batters and benches would be covered in overburden, which would need to be compacted where it was inundated, and rock beaching at the water line would probably be needed. This option would require a considerable amount of overburden;
- placement of overburden on the benches and against the batters – If the intention were to be a 1V:3H slope, only part of the coal batter would be covered with overburden.

The proponent has adopted as a base case the fourth option and this is shown in diagrammatic form in Figure 8.5 in the EES. This figure is reproduced as Figure 30 below. In addition to the revegetated batters and benches, parkland would be established around the perimeter of the mine, safety mounds would be formed and a security fence erected. The proponent would give consideration to providing access to the mine lake for the public to enjoy passive recreational and aquatic facilities.

The Panel supports the preference of the DPI for the 1V:3H slopes for batters and notes that historically there have been much steeper coal batter slopes in the Latrobe Valley mines. The existing batters at the Hazelwood mine are generally in the category of steeper batters and the DPI recognised that in some situations there is not sufficient room to reduce the slope of these batters. The Panel has taken particular note of the approach taken by the DPI to the matter of batter slopes when it stated:

> *"The Department accepts that the battering of overburden faces would improve the rehabilitation outcomes. However the Department also believes that the proposal for the coalface system is not ideal and may present future environmental and safety issues. It is the Department's view that improved outcomes are possible and will require IPRH to work constructively with it in identifying and resolving these issue during the Work Plan and final Rehabilitation Plan processes."*

The batters in the new faces of Phases 1 and 2 of West Field could be constructed to provide any agreed profile.

With all four batter treatment options considered by IPRH, there is a need for maintaining the horizontal drainage bore holes, or implementing some other form of drainage system. The aim is to ensure that the coal batters are preserved by preventing them from collapsing due to the water pressure within the remaining, unmined coal. The DPI identified this matter as important and stated:

> *"….. although the EES discusses a mechanism for protecting the floor from heave it lacks detail on how the batter drains will be maintained beyond the life of the mine. IPRH has a well-established drainage system but if that fails over time then the problem of batter instability will re-emerge. The issue is also important in main face drainage in preventing cracking clay in the northern end of MRD5. DPI will require that the system IPRH leaves behind on the cessation of mining <u>must</u> be self-sustaining."*

Figure 30 Batter treatment (base case)

The Panel fully supports the DPI view of the importance of the need for the continuing effectiveness of a drainage system to maintain batter stability after mining has ceased. IPRH also recognises this need but must give more detailed consideration of how a permanent drainage system for the batters can be maintained into the future. Presumably a permanent drainage system for the batters after the cessation of mining is a common difficulty faced by all the miners in the Latrobe Valley. On this basis, the Panel encourages the proponent and the DPI to work together with the other Latrobe Valley miners to seek an industry-based solution to this problem.

20.2.3 WATER QUALITY

Leachate tests on the ash from the ash dump (that will be inundated by the water) exceed the requirements for the ash to be classed as clean fill because of elevated levels of nickel. Mercury levels in the leachate were within the limit for clean fill but were very close to the limit. As the leachate volume from the ash dump will be small in comparison to the other sources of water, the mixed water quality in the mine lake should meet the requirements for these trace elements for both drinking water quality and recreational water quality.

Studies on the predicted salinity of the water in the mine lake indicate that the total dissolved solids (TDS) will be about 1,000 mg/L. This level of TDS is above the level permitted for drinking water quality but the water quality would certainly be acceptable for stock watering and recreational use.

20.3 REVEGETATION

Section 8.7 of the EES contains considerable information on the revegetation procedures already generally adopted by IPRH and which are expected to be used in the future rehabilitation of the mine. It should be noted that the procedures involve a range of considerations and include:

- climate and optimal times for sowing, fertilising and planting;
- soils, topsoil handling and placement;
- preparation of overburden batters and coal batters for sowing & planting;
- selection of plant species for overstorey (trees & tall shrubs), midstorey (shrubs) and understorey (sedges, grasses herbs & rushes);
- use of fertiliser at time of sowing and at time of planting;
- weeds and weed control – pre-planting and post-planting;
- exclusion of domestic grazing animals and control of vermin and other pest animals;
- erosion control and fire prevention.

The EES points out that revegetation options are constrained by a shortage of topsoil. Therefore most of the revegetation will involve growing vegetation in overburden, or a mixture of coal and overburden, spread over the surfaces of the benches or batters, depending on the batter stability option adopted.

IPRH is planning further trials to evaluate a range of parameters that are likely to affect the success of revegetation. These include evaluations to test the most suitable soil / overburden ratio, moisture content, nutrient level, fertiliser applications, etc. Other trials will assess the

indigenous species that respond well to the range of conditions that will be met in the rehabilitation process. Trials are also planned to assess planting techniques that produce the optimum coverage of tree species.

The Panel supports the idea of a program of practical trials to evaluate the various effects that could be important in achieving the best revegetation outcomes for the mine. The panel considers that getting the required answers to difficult questions is far more important than moving quickly into a rehabilitation program for the sake of an early start to rehabilitation. However this view does not mean a "do nothing" approach to implementing rehabilitation.

Actions to prevent and control soil erosion are needed while the questions about longer-term revegetation are resolved. Erosion control on overburden dumps is one such an action where the sowing of cover crops would be advantageous. Not only would this have advantages in reducing the potential for soil erosion, it would also be a useful technique to add organic matter and if legumes are used as a component of the cover crops, they will also add nitrogen to the "over burden soil".

The Panel notes the statement in the EES on page 8-22 that:

> *"Indigenous vegetation will be used in revegetation. The use of species associated with the endemic EVCs will depend on their tolerance to coal and overburden or a mix of the two. The vegetation communities of the rehabilitated mine will be highly modified in comparison to the pre-1750 EVCs, but a self sustaining ecosystem will establish itself within the mine catchments."*

The DSE in its submission supported the inclusion of indigenous species in the proposed revegetation of the mine site. However the DSE noted that the use of plant species would depend on their tolerance to coal and overburden. It went on to state:

> *"It is noted by the proponent that the use of plant species will depend on their tolerance to coal and overburden (EES, p8-22). Additionally, DSE notes that the mine faces will not replicate the original topography of the area, providing very different degrees of insolation and moisture. Initial choice of plants may be limited to the more robust species found in the area but not necessarily on the site."*

The DSE indicated a preference for the flattening of the batters and capping them with overburden to '*provide a more hospitable substrate for plants to establish in and would have the additional, not insignificant, benefit of reducing the risk of fire on the exposed coal surfaces'*.

The DSE concern with the potential for fire was further commented upon:

> *" …. If indigenous vegetation is to be recreated, it may well be a requirement for the correct ecological functioning of that vegetation that it be burnt on a cyclical basis. Ecological burning is likely to be a high-risk operation among exposed coal faces."*

The Panel agrees with the DSE about the concern of using fire for ecological reasons on the revegetated mine batters. The Panel would go further than the DSE and suggest that even with capping with over burden, the use of fire in the mine could still be a fire risk. Exposure of coal due to uneven spreading of over burden is a possibility. Erosion of the over burden capping on what would still be quite steep slopes is probably even more likely. And there is always the question of the existence of fire holes in the area; their very existence suggests that fires in the coal occurred well before any intervention by man.

In the panel's view, the use of indigenous species should be of secondary importance to the basic need for a sustainable ecosystem to become established in a highly modified environment. It is the highly modified environment that needs primary consideration and if it is found that some non-indigenous species have advantages over indigenous species, then they should have a place in the revegetation. There is already evidence of species of trees and shrubs that have been able to voluntarily establish themselves on the existing older coal batters around the mine. The photographic evidence in the EES shows that some pine trees (presumably Pinus radiata that is already grown in plantations in the area) have become established, as have bracken and ferns. Visual inspection of these areas showed the result to be sparse and uneven, as might be expected.

The ultimate aim should be an ecosystem that, irrespective of whether the species are all indigenous or not, has a minimal requirement for human intervention to sustain it. In the longer term, it will be the mix of species that will determine the sustainable ecosystem, not man's desire for one form of vegetation against another.

20.3.1 PROGRESSIVE REHABILITATION & REVEGETATION

For a number of reasons there is a desire by the DPI and the proponent for a progressive rehabilitation of the mine site rather than delay the commencement of rehabilitation activities until near the end of the mine's life. Of particular importance to the proponent is that a reduced level of rehabilitation bond will be a financial saving. A bond is mandatory and as was pointed out by the DPI the level of bond set at the time of the privatisation of the electricity generation market was $15 million for each electricity generator. The longer a bond exists at a high level, e.g. continues until close to the end of mining, the more costly it is to finance. So if rehabilitation planning is advanced and rehabilitation activities have been occurring, the level of the bond can be reduced. This could be a significant saving to IPRH because the cost of the bond would be reduced.

However, as discussed above, there are operational constraints that prevent a substantial progressive rehabilitation of the Hazelwood mine. There is also a need for further investigations to obtain some fundamental information that will more precisely predict the level of water in the proposed mine lake. In addition there is the need to obtain more scientific data about the various factors that are important in developing the most effective revegetation in a highly modified environment.

Irrespective of these constraints and uncertainties, planning for mine closure and rehabilitation cannot wait until close to the end of the mining activity. IPRH acknowledges and fully understands that the DPI requires a rehabilitation plan as part of the Work Authority process. Some rehabilitation has occurred, both planned and through volunteerism by some plant species. In the view of the Panel, the trial work on revegetation should be progressed with some degree of urgency so that further practical experience of revegetation can be obtained. There was considerable discussion at the Panel Hearings about how the DPI might handle a Rehabilitation Plan that was more conceptual rather than one that was clear and reasonable. The expectation of the DPI is that a definite Rehabilitation Plan is to be submitted with the submission of the Work Plan. The DPI can then assess the Rehabilitation Plan and establish an appropriate dollar value for the Bond. The amount set should be sufficient to cover the costs of implementing the Rehabilitation Plan, even if the proponent is unable to undertake the rehabilitation.

Elements that require some monetary provision include:

- removing machinery;
- laying back batters;
- moving overburden;
- vegetation rehabilitation and landscaping;
- groundwater pumping for several years.

Figures in the vicinity of $25 to $50 million were mentioned at the hearing.

20.4 PANEL COMMENTS

The Panel appreciates the provision by IPRH of a frank and logical description of the difficulties that it faces in seeking to prepare a Rehabilitation Plan. IPRH is obviously concerned about providing a definite plan when there are important deficiencies in fundamental data on which to base a Rehabilitation Plan. This especially relates to the questions about mine stability. The DPI, quite correctly in the view of the Panel, was particularly concerned about batter stability and made its position very clear with regard to the need for a permanent drainage system. This is irrespective of which option IPRH might wish to adopt for its Rehabilitation Plan.

The Panel's view is that there should be frank and open discussion of these issues between the proponent and the DPI to seek a mutually acceptable outcome. The outcome must be one that does not compromise the ultimate aim of having a sustainable rehabilitation of the mine site.

Elsewhere in this report there is detailed consideration of the potential and desirability of enabling the West Field to be extended into the Driffield Coal Field. Such an extension of the Hazelwood mine would avoid the quarantining of a large volume of coal. Clearly if this development did eventuate it would affect the proponent's Rehabilitation Plan. However discussion of this possibility has not been considered in any discussion of the Rehabilitation Plan. The decision on such an extension of mining is obviously some years off. Therefore the Panel is mindful of the potential for such a change in the future, but has not included any commentary on it in this report.

A similar comment could also apply to the potential for the ash dump to be mined for its magnesium content. IPRH is aware of the potential of such a development sometime in the future. Again this matter is not discussed in this section of the report. Never the less the Panel notes that if this proposal eventuates it would have some impact on the Rehabilitation Plan, including the need to undertake the recycling of the ash before any potential inundation of the ash dump occurred.

The Panel has already commented on the subject of revegetation. It is very clear to the Panel that the selection of species for inclusion in the Revegetation Plan should depend on the suitability for the task of producing a sustainable ecosystem. While indigenous species will undoubtedly be the major component of the mix of species, there seems no valid ecological reason why non-indigenous species could not be included in the mix if this proves to be desirable or necessary.

Although there is a DPI requirement for a Rehabilitation Plan to be submitted by the proponent as part of the Work Authority process, the bulk of the rehabilitation work cannot take place for some years yet if the West Field Project is approved. Consequently the Panel would support a phased approach to the final rehabilitation plan, with immediate attention given to:

- trials to evaluate which species are the best to use and the agronomic variables that provide the best outcomes;
- further groundwater studies to gain knowledge on which to base the final rehabilitation plan.

There would seem to be advantage in both these shorter-term actions being undertaken on a cooperative basis with the other mine operators, and with the coordination and support of DPI.

It seems to the Panel that in relation to the review of the bond, this is a matter that needs to be resolved by further discussions between IPRH and DPI, and the Panel encourages both parties to seek such an outcome. If a mutually agreed outcome is unable to be reached, the Panel sees no other option than for DPI to impose its own level of Bond, based on minimising the exposure of the State to risk due to IPRH being unable to carry through the mine closure rehabilitation.

20.4.1 CONCLUSION ON MINE CLOSURE AND REHABILITATION

The long-term view is that the mine void will become a mine lake but the filling of the mine needs to be done in a controlled and measured way over many years. There are a number of significant uncertainties that need to be resolved before a mine closure plan and rehabilitation plan can be finalised.

There is uncertainty about the hydraulic connection between the Morwell and Traralgon aquifers, which has implications for the stability of the mine. Stability is required to prevent the complete collapse of the mine floor and of the batters into the mine void. Water pressure in the deeper aquifers must be stabilised over time, while water pressure within the joints between the coal blocks must be reduced by some form of drainage system that will continue to function well for perhaps hundreds of years into the future.

A further uncertainty is the choice of techniques and practices that will produce the best revegetation outcome for the rehabilitation of the Hazelwood mine. There are many variables that are involved but the objective should be very clear – to produce a stable ecosystem in a highly modified environment, one that requires minimal human intervention to sustain it.

These uncertainties are common to all the miners in the Latrobe Valley. Consequently there appears to be considerable advantages by the industry adopting a co-operative approach with DPI taking a coordinating role to assist in the resolution of the rehabilitation issues.

Despite these uncertainties, IPRH needs to provide an adequate Mine Closure Plan and a Rehabilitation Plan, or agreement on a process to reach this

end, in order to achieve a Work Authority from the DPI. The Panel expects that this is more likely to be achieved through a co-operative approach between IPRH and the DPI.

20.4.2 RECOMMENDATIONS ON MINE CLOSURE AND REHABILITATION

The Panel recommends that:

- **IPRH continue with its investigations into:**
  - **the aquifer pressures and the degree of hydraulic connection between the Morwell and Traralgon aquifers and their respective influences on water level in the mine lake;**
  - **the issues associated with the potential for long-term batter instability after mining ceases;**
  - **trials to seek suitable species for the sustainable revegetation of the mine batters and the mine site in general, including both indigenous and non-indigenous species;**
- **DPI facilitates a cooperative arrangement between the mine operators in relation to the industry-wide problems of long-term batter instability after mining ceases;**
- **DPI facilitates a cooperative arrangement between the mine operators in relation to the revegetation trials, and that DSE provides its expert input to the trials.**

21. ENVIRONMENTAL MANAGEMENT

21.1 IPRH ENVIRONMENTAL MANAGEMENT SYSTEM

IPRH manages the potential environmental impacts of its day-to-day operations at the existing Hazelwood Mine and Power Station through the IPRH Environmental Management System. Major contractors (the alliance partners Roche Thiess Linfox) working on site are required to conform to this. This system will be adapted to include the mine extension and a similar process will be established by the alliance partner to construct the Morwell River and stream diversion works and the Strzelecki Highway deviation.

IPRH's Environmental Management System was certified under AS/NZS ISO 14001 in February 1998 and has been recertified in 2000 and 2003. The IPRH Chief Executive Officer is responsible for compliance with the system including actioning of any areas of non-compliance. The whole organisation shares responsibility for the system, with the inclusion of environmental performance as a component in the employment bonus scheme.

The environmental management system was explained in chapter 12 of the EES. Within this system, a series of co-ordinated documents are generated – action plans, work instructions, monitoring programs etc; and the resulting processes are put into action. The EES outlined the operation of the system, and listed key elements – dust monitoring, batter stability, landfill inspection, artesian dewatering monitoring and gas emissions monitoring. The operations of the Environmental Management Audit Committee (senior management) and the Environment Review Committee (IPRH meets with agency and community interest groups) were explained.

In Section 12.3.2 of the EES commitments made by IPRH during the planning of the West Field Mine are listed and discussed. These included commitments relating to Aboriginal and non-Aboriginal heritage, biodiversity conservation, community consultation, dust, the river diversion and the road deviation, tree planting, ground movement, noise, water quality and mine closure and rehabilitation. Monitoring programs were also discussed.

21.2 PANEL REVIEW

Although the Panel was of the view that the proposed system was satisfactory, and that a number of commitments had been made, the Panel noted that, throughout the EES, and also at the Hearing, IPRH made many (further) detailed commitments that were not listed in the EES. The Panel's Directions are reproduced at Appendix B1. In Direction 2(f) the Panel said, in part, that:

> *'it is not satisfied with the degree of specificity provided with respect to the ongoing environmental management of the proposed works'.*

The Panel also said:

> *'the EMP for the project will be a document that is progressively refined throughout the approval, detailed design, construction, operations and rehabilitation phases of the project'.*

In response to this direction, IPRH produced a Planning Environmental Management Plan (IPRH exhibit 8). This comprehensive document meets the requirements of the Panel Direction 2(f) in that it sets out the details of the matters to be addressed, and includes specific sections for the:

- Construction Environmental Management Plan (CEMP) for design and building river and stream diversions and the highway deviation;
- Operating Environmental Management Plan (OEMP) for the extension of the West Field Mine.

The document includes a comprehensive list and discussion of issues to be addressed, including those matters within the CEMP and the OEMP, which can be further developed as detailed planning proceeds. Appended to the document is a full cross-referenced list of commitments made in the EES and during the Hearing.

This Planning Environmental Management Plan is a key document to be referenced in the Planning Permit for the stream diversions and the Highway deviation, the Work Plan for the mine extension and the EPA Works Approval.

A number of additions are required to update the Planning Environmental Management Plan and these are listed in the various recommendations throughout the Panel report.

The Panel considered that the name adopted, the *Planning Environmental Management Plan*, carried with it a connotation that the plan would only effect the planning phase of the project, and that at some later stage the CEMP and the OEMP might become separate documents. The Panel has no difficulty with the concept that the CEMP and the OEMP may be reproduced separately for contract and administrative purposes. What is of concern, however, is the possibility of the *Planning Environmental Management Plan* being only transitory, and being replaced in time by the CEMP and the OEMP. The Panel sees the *Planning Environmental Management Plan* as the single comprehensive EMP for the project, a document that will be updated from time to time, but one that will remain in its entirety to provide an audit trail and reference for the project. For these reasons, the Panel believes it should be called the **Project Environmental Management Plan (PEMP).**

A final matter that was discussed at some length at the Panel Hearing concerned the ambit of the work plan required under the MRD Act. As the work plan contains the requirement for the EMP, it would seem desirable for this EMP to be comprehensive. There was some ambivalence on the part of DPI concerning the scope of matters that could be in an EMP referenced under the work plan. At various times DPI advised that the EMP could only cover matters within the Mining Licence boundary. At other times advice was provided that some off-site amenity monitoring (i.e. dust and noise) could be required in the work plan EMP.

Similarly there was some initial ambiguity concerning the way in which Net Gain offsets would be conditioned and managed. Final advice from Enesar and DSE is provided in Section 22.4.4 below.

The Panel is concerned that there should be a clear policy within DPI that provides for a comprehensive approach to the scope of environmental management. In particular, DPI should clarify that:

- the EMP referenced in the work plan covers off-site ameliorative measures arising as a consequence of the mining;
- the EMP referenced in the work plan is a comprehensive document, bringing together all the environmental management requirements of the project.

As the PEMP (which includes both the CEMP and the OEMP) will be subject to change as the detailed design is undertaken, and may be subject to further change through construction, commissioning of the diversion works, rehabilitation, Net Gain offset provision and mining, it is essential that it is clearly recognised by all parties that the PEMP is not a static document. Further, it should be the only EMP for the project, so that there is only one authoritative document that requires updating, and only one authoritative and updated document that is referenced.

21.2.1 CONCLUSIONS ON ENVIRONMENTAL MANAGEMENT

The Panel is of the view that after attention to the matters listed above, the proposed Planning Environmental Management Plan, renamed the Project Environmental Management Plan, will comprehensively detail the various requirements identified at the present stage of the project development, including the requirements for construction (Chapter 7, the CEMP) and operations (Chapter 8, the OEMP). It will evolve throughout the finalisation of the approval process, through detailed design, through the construction of the stream and road diversions, through the mine operation and through the rehabilitation of the mine. The document is a key reference source for the Planning Permit to construct the stream and road works, for the work plan(s) for the extension of the mine, and for the EPA Works Approval.

21.2.2 RECOMMENDATIONS ON ENVIRONMENTAL MANAGEMENT

The Panel recommends that:

- **the Planning Environmental Management Plan be renamed the Project Environmental Management Plan (PEMP);**
- **the PEMP be updated by IPRH to include the various recommendations of the Panel, where supported by the Minister's Assessment;**
- **the PEMP be adopted and referenced in Planning Permit 04190, the EPA Works Approval and the mine extension Work Plan;**
- **the PEMP, which includes the CEMP and the OEMP, cover on-site and off-site monitoring and ameliorative works;**
- **the PEMP be recognised and understood by all parties to be subject to change as the detailed design is undertaken, and may be subject to further change through construction, commissioning of the diversion works, rehabilitation, Net Gain offset provision and mining;**
- **the PEMP be the only EMP for the project, so that there is only one authoritative document that requires updating, and only one authoritative and updated document that is referenced;**

- **the ERC review the PEMP periodically to ensure that it includes the outcomes of the approval process, the detailed design, and any further ameliorative measures that are required to address further problems that may arise. The ERC should be kept fully informed of the progressive detailed design outcomes, and the results of the monitoring program and any complaints about the construction and operation of the West Field works.**

22. APPROVALS

"Does the proposal, and the impact of greenhouse gas emissions arising from it, balance the present and future interests of all Victorians and the maintenance of ecological processes?"

22.1 INTRODUCTION

Section 42 (7) of the Mineral Resources Development Act (MRD Act) states:

> *"If under sub-section (6) or any planning scheme a permit is required to be obtained for carrying out mining on the land covered by a mining licence in accordance with that licence, the licensee is not required to obtain a permit for that work if—*
>
> *(a) an Environment Effects Statement has been prepared under the **Environment Effects Act 1978** on the work proposed to be done under the licence; and*
>
> *(b) an assessment of that Statement by the Minister Administering the **Environment Effects Act 1978** has been submitted to the Minister; and*
>
> *(c) a work authority has been granted by the Minister following the Minister's consideration of that assessment,"*

Clause 52.08 (Mining) of the La Trobe Planning Scheme states that a permit is required to use or develop land for mining, unless either:

- An environment effects statement has been prepared under the Environment Effects Act 1978 and mining is exempt from the requirement to obtain a permit under Section 42 or Section 42A of the Mineral Resources Development Act 1990.
- The mining is in accordance with and within an area covered by a mining licence granted or Order made by the Governor in Council under Section 47A of the Electricity Industry Act 1993.

Within the Latrobe Planning Scheme, large areas of the coal resource are zoned Special Use Zone 1 (SUZ1). Within these areas, mining does not require a permit, provided the conditions of Clause 52.08 are met, and the excavation is at least 1000 metres from a paper mill, residential zone, or land used or in a Public Acquisition Overlay for a hospital or school.

The reference to Mining in the Schedule 1 to the Special Use Zone, Brown Coal, does not include any associated uses, and the construction of the diversions of the Morwell River, Wilderness Creek and Eel Hole Creek require a permit for areas outside a mining licence area.

With regard to the other consents, permits and authorities set out in Section 2.2.5 of the EES, and to the extent that they are not explicitly addressed in this report, the Panel sees no impediment to their evaluation and approval by the responsible authorities, so long as they have due regard to the Minister's Assessment following the submission of the Panel's report.

22.2 THE ENVIRONMENT EFFECTS ACT 1978

The Environmental Effects Statement, undertaken and assessed under the *Environmental Effects Act 1978*, is a way of undertaking a comprehensive evaluation of a proposal, and co-ordinating all the various statutory approvals. The issue of greenhouse gases from the Hazelwood Power Station was excluded from consideration in the EES through the DSE Assessment Guidelines, and was excluded from consideration in the Panel Hearing by the Minister's Directions. As detailed in Section 4.3, following the Order by Justice Stuart Morris, and after considering the reach of that order, the Panel has been compelled to include the assessment of the impact of the HPS greenhouse emissions in its deliberations. Thus all the impacts of the proposal raised by IPRH, submitters and approval authorities have been considered by the Panel.

A brief summary of the various matters considered, and relevant to the Panel's overall assessment of the IPRH proposal, is provided in Table 28 below. Matters such as mine closure and rehabilitation, the Environmental Management regime, and conclusions concerning supplementary desirable actions by government have not been included here (though they are included in Section 24, Conclusions and Recommendations), as the matters do not directly affect the assessment of whether the proposal should be approved.

Assessment against the Strategic Assessment Guidelines, undertaken below in Chapter 23, is not referred to in Table 28. The actual impacts and policy considerations relevant to the Strategic Assessment Guidelines have already been included in Chapters 7 through to 19, and Chapter 23 provides no new analysis, merely a summary of material already presented earlier in the report.

Table 28 Summary of issues and impacts

SECTION REFERENCE & ISSUE	PANEL'S CONCLUSION ON THE IMPACT OF THE PROPOSAL	PANEL COMMENT ON THE NATURE OF THE IMPACT
7.Meeting future electricity needs	Given the lead time for alternative technologies, the absence of significant demand management in an environment of low electricity prices, and the expected increase in annual electricity demand, the Panel concludes that the IPRH proposal for the West Field development is the most economical alternative for the supply of base load electricity to Victoria and the National Electricity Market.	Positive
8.Most efficient use of brown coal	Taking into consideration the current and future needs, the size of the brown coal resource, and the opportunity for increased efficiency from Hazelwood in the future, the Panel concludes that the proposal is an appropriate use of the Gippsland brown coal resource.	On balance positive.
9.River diversion & mining options	The Panel endorses the selection of MRD5 by IPRH in favour of other possible river diversions. In relation to the mining method, the Panel accepts that it is presently economic to maintain the bucket wheel excavator operation, and notes that a shift to partial dozer operations is likely as new plant is required.	Positive.

10. Interface issues with HRL	The Panel concludes that it is entirely reasonable for IPRH to seek approval for the location of MRD5 and the relocation of the Strzelecki Highway in the manner set out in the EES. The mining legislation, the planning framework and past experience support the view that infrastructure can appropriately be sited on land covered by exploration licences held by third parties.	Neutral.
11. The proposed Fifth Morwell River Diversion	With respect to the proposed Fifth Morwell River Diversion and the diversions of the Eel Hole and Wilderness Creeks, the Panel concludes that the location, design and construction processes are satisfactory. From an environmental point of view, the Panel is of the opinion that the proposal for the MRD5 is far superior to the currently operational MRD2 (which relies upon an underground drain for low level flows with minimal treatment of the flood way channel) and allowing for the fact that it will be 'man-made', it will be a reasonable facsimile of a natural water course. The same comment applies to the Wilderness Creek diversion that replaces a degraded section of this stream. The design retains part of Eel Hole Creek that has a high environmental value and complements this with a high quality diversion.	Positive
12. Traffic and transport	With respect to the alignment and configuration of the Strzelecki Highway deviation, the Panel generally accepts the design proposed by the proponent with the minor provisos stipulated. With respect to the selection of a replacement for the existing Over Dimensional Route 9, the Panel concludes that a route following Marretts Road, the Strzelecki Highway deviation and Yinnar Road to Hazelwood and then via the existing route should be adopted subject to the adoption of changes to the Latrobe Planning Scheme to accommodate alignment option 4 (the lower route behind the cooling pond foreshore) in the vicinity of the Hazelwood Cemetery.	Negative but minor, in view of the increased travel time and inconvenience expected for some users.
13. Flora and Fauna	Overall, the proposal for the Fifth Morwell River Diversion and the mining within West Field Phase 2 will re-establish a more natural regime for the Morwell River, while the "net gain" offsets and restoration of the riverine system and wetlands should satisfactorily mitigate the impacts of the proposal on flora and fauna, and may improve ecological values.	Positive

14.Groundwater extraction and use	While ground water extraction is significant, there is only minimal (if any) impact on other users. IPRH's Hazelwood operations have a minor impact on the Latrobe River system through the use of their allocation of 14 GL/year from the Tyers River. The depressurisation of the aquifers at the Hazelwood mine would not cause any measurable impact on water inputs or levels in the Ramsar wetlands of the Gippsland Lakes.	Negative, though minor.
15.Air quality and health	… the results show that dust is a potential problem at some residences relatively close to the construction activities in some years. Although the number of predicted exceedances of the PM10 intervention level is not high, these occurrences demonstrate the need for an effective dust control strategy. Evidence has been presented that shows that the dust problems can be suitably managed to ensure that dust does not have a serious impact on neighbouring properties. The risk assessments performed for silica in dust, which is a causative factor for lung cancer and silicosis, have been thorough and convincing. …On the basis of these risk assessments, the Panel concludes that the health impacts on neighbours and the general public are very unlikely to be significant or indeed measurable.	Negative, though minor.
16.Noise	While the general outcome of the noise modelling is that noise is unlikely to be a serious nuisance to neighbours, this is not beyond doubt. For this reason the Panel's view is that the planned monitoring program for the West Field Project needs to be carefully considered. Further manned background measurements should be carried out at sites where exceedances are most likely (BG5, BG6 and BG7), and monitoring of noise arising from the construction and operations should be undertaken in response to complaints until sufficient experience is obtained to use professional judgement, augmented by some measurements. Final details of the additional background measurements and the frequency of monitoring measurements should be decided in consultation with EPA.	Negative, though minor.
17.GHG from construction	The assessment of greenhouse gas emissions from the construction of the road and river diversions and from coal mining has been adequately addressed in the EES. Procedures to monitor fuel and electricity use have been identified, as have actions to improve energy efficiency. The nature of the construction and	Negative, though minor.

	operational activities does limit the opportunity to make large-scale reductions in greenhouse gas emissions through the use of new technologies. Never the less the Panel's view is that some efficiency gains are still possible, especially with the pumping activities associated with the mine, which will continue till mine closure.	
18.GHG from HPS	The Panel accepts that an order-of-magnitude estimate of the cost of the impacts of greenhouse gas emissions from HPS over the period 2011 to 2031 (and the effect of those gases in the global ecosystem for many years after that) compared to replacing HPS with a more greenhouse friendly option, might be of the order of $200 million. Views relating to conditions of sale of HPS to IPR, the uncertainty of whether potential replacements to HPS would yield significant greenhouse advantages in the short to medium term, considerations of sovereign risk, and the likelihood of an emissions trading scheme being implemented at a national level in the medium term, differ substantially. The voluntary agreement between IPRH and government (the Deed) outlined in broad terms to the Panel appears to provide a reasonable way forward in the short term, and is supported by the Panel. The Panel would be very concerned if the Deed were completed in such a way that the government had no flexibility in either setting the entry parameters for HPS in a future ETS, or changing those parameters in the light of experience. In the absence of any comprehensive ETS, continued implementation of the PEM(GGEE) beyond 2006 is seen as essential. The Deed should clarify that the requirements of the PEM(GGEE) and the associated IPRH Action Plans beyond 2006 are additional requirements to the greenhouse gas emissions savings specified.	Significant negative, offset by equity, policy and technical considerations and constraints in the short term.
19.Other social issues	The works to implement the proposed river and road diversions and the West Field Mine extension have the potential for major intrusion on the landscape. However, the Panel concludes that IPRH have taken reasonable steps to ameliorate and manage these impacts during the river and road construction processes and to minimise the visual intrusion of the mine to an acceptable level. Retention of jobs by the extension of the Hazelwood mine is a clear community priority.	Positive social impact in the short to medium term if HPS continues to operate

	Closure of the Hazelwood power station and mine complex in 2009 would be likely to create a high level of unemployment in the Latrobe Valley. Sufficient time is required to develop alternative brown coal to electricity generation to enable the workforce to remain relatively constant. IPRH is acting in a responsible manner in its dealings with the directly impacted local community. The Panel notes that the Work Authority required under the MRD Act contains requirements for consent and compensation arrangements. With respect to compensation or replacement of public facilities, the Panel would anticipate that IPRH would conclude formal agreements with the Council and the CFA, and these agreements would satisfy the requirements of the Work Authority.	

Many of the impacts listed above seem to the Panel to be fairly marginal in relation to an assessment of whether the proposal should be approved. The key issues, in the Panel's view, are the need to meet future electricity needs, social impacts associated with the closure of the HPS, and the greenhouse gas impacts from the HPS.

As stated in the Table 28, given the lead time for alternative technologies, the absence of significant demand management in an environment of low electricity prices, and the expected increase in annual electricity demand, the Panel concludes that the IPRH proposal for the West Field development is the most economical alternative for the supply of base load electricity to Victoria and the National Electricity Market. While the greenhouse gas emissions from the continued operation of the HPS is a significant negative, it is offset by equity, policy and technical considerations and constraints in the short term. In the longer term it is anticipated that an ETS will assist in leading to a more sustainable outcome. The social impacts of the closure of HPS would be significant in the short to medium term.

Subject to the various conclusions and recommendations made throughout this Panel Report, the Panel is satisfied that the impacts associated with the proposal have been properly considered, and in the main can be adequately ameliorated. Although there are some significant impacts that cannot be ameliorated, and some residual impacts after ameliorative measures, these are outweighed by the benefits to the State in terms of uninterrupted power supply and social cohesion.

22.2.1 CONCLUSIONS ON THE EES

The Panel concludes that subject to the various recommendations made throughout this Panel Report, the impacts associated with the proposal have been properly considered, and in the main can be adequately ameliorated. Although there are some significant impacts which cannot be ameliorated, and some residual impacts after ameliorative measures, these are outweighed by the benefits to the State in terms of the significant contribution that Hazelwood Power Station will continue to make to Victoria's power supply, and the benefits to local economic activity, employment and social cohesion, particularly in those years

before more energy efficient combustion technologies are put into commercial operation for brown coal.

22.2.2 RECOMMENDATION ON THE EES

The Panel recommends that that subject to the various recommendations made throughout this Panel Report the proposal should be approved.

22.3 THE MINERAL RESOURCES DEVELOPMENT ACT 1990

As set out earlier in this Report, IPRH have indicated that they will seek a new Mining Licence immediately on the lifting of the exemption on exploration and mining licences pursuant to Section 7(5) of the MRD Act. The Minister has advised IPRH that the lifting of the Exemption is conditional on negotiations on the issue of greenhouse gas emissions from the Power Station.

IPRH has indicated that if the proposed Mining Licence extension was not granted (presumably if there was a breakdown in negotiations on greenhouse gas emissions), it may elect to continue mining within its current Mining Licence area (MIN5004) beyond 2009. This would still involve moving the river, creeks and roads, and amending the Work Authority to stay within the confines of MIN5004. Amending the Work Authority requires changes to the work plan, review of the rehabilitation bond, obtaining other necessary approvals, and having consent and compensation agreements with owners and occupiers of the affected land.

While such a course of action may avoid the need to consider greenhouse gases under the requirements of an amendment to a Work Authority, there seem to be other impediments, including the order of Justice Stuart Morris and his judicial ruling that there is a nexus between Planning Scheme Amendment C32 and the issue of greenhouse gases arising from the burning of brown coal in the Hazelwood Power Station, being coal made accessible by the Morwell River Diversion. These include:

- the need to consider the proposal holistically, and to assess all impacts (including the greenhouse gas impacts) under the Environment Effects Act;
- the need to obtain a planning permit for the construction of the river and creek diversions outside the area of the existing and proposed mining licence (see Section 22.4.3 below);
- the need to satisfy the requirements of the Commonwealth under the EPBC Act through the accredited EES process (see Section 22.7 below).

DPI submitted a draft schedule of conditions for the proposed Mining Licence (Supplementary Submission 527L, dated 19/7/04). The general form of these conditions enables the later development of work plans and an Environmental Management Plan. DPI clarified beyond any possible doubt that it expected the Panel to consider and provide advice on the proposed Mining Licence, even though the application for the licence was presently prevented by the Exemption.

The Panel considers that the extended Mining Licence to be sought by IPRH can be issued, providing a satisfactory negotiation on greenhouse gases is concluded, and the other recommendations of the Panel that relate to the conditions for mining and ongoing

management and monitoring are adopted in the Mining Licence, the Work Plan or the PEMP as appropriate.

The Panel cautions that, contrary to the view expressed on behalf of IPRH that a Mining Licence can be issued at any time, the provisions of the *Environment Effects Act 1978* effectively stop the making of any decisions relating to proposals for which the Minister has required the preparation of an EES, until the Minister's Assessment has been made and considered.

In relation to the Work Plan required under the Mining Licence, a condition to provide for Net Gain offsets is described in Section 22.4.4 below. It is applicable to the Work Plans under the existing and proposed Mining Licence.

22.3.1 CONCLUSIONS ON THE PROPOSED MINING LICENCE

The Panel concludes that, providing a satisfactory negotiation on greenhouse gases is concluded, and consideration is given to the recommendations of the Panel that relate to the conditions for mining and ongoing management and monitoring being adopted in either the Mining Licence, the Work Plan or the PEMP as appropriate, the extended Mining Licence to be sought by IPRH can be issued.

22.3.2 RECOMMENDATION ON THE PROPOSED MINING LICENCE

The Panel recommends that:

- **providing a satisfactory negotiation on greenhouse gases is concluded, and consideration of the Minister's Assessment under the Environment Effects Act 1978 (which is anticipated to reflect generally the recommendations of the Panel that relate to the conditions for mining and ongoing management and monitoring are adopted in either the Mining Licence, the Work Plan or the PEMP as appropriate), the extended Mining Licence to be sought by IPRH be issued;**
- **a condition to the proposed Work Plan under both the existing and proposed Mining Licence as follows:**

  The proponent is to prepare and implement a native vegetation offset program, to the satisfaction of the Secretary of the Department of Sustainability and Environment, to achieve a 'net gain' biodiversity offset in accordance with the requirements of 'Victoria's Native Vegetation Management – A Framework for Action' and any associated guidelines, for the removal of native vegetation for the proposed works."

22.4 THE PLANNING AND ENVIRONMENT ACT 1987

22.4.1 AMENDMENT C32

The amendment changes Maps 28 and 29 of the La Trobe Planning Scheme by:

- rezoning the Strzelecki Highway between the proposed Wilderness Creek Diversion, Driffield and Driffield Drilling Depot Road, Morwell from Road Zone Category 1 to

Special Use Zone 1 – Brown Coal, and including a Road Closure Overlay over the same land, except for that part to be retained south of Wilderness Creek Diversion;

- rezoning Brodribb Road between the Strzelecki Highway, Driffield and Yinnar Road, Hazelwood from Road Zone Category 2 to Special Use Zone 1 – Brown Coal, and including a Road Closure Overlay over the same land;
- including a Road Closure Overlay over the following roads:
  - *Marretts Road, Driffield, south of Buckleys Track;.*
  - *Deans Road, Driffield, east of the proposed Strzelecki Highway Deviation;*
  - *Golden Gully Road, Driffield, east of the proposed Strzelecki Highway Deviation;*
  - *Amiets Road, Driffield;*
  - *Homestead Road, Hazelwood;*
  - *Applegates Road, Hazelwood, north of Homestead Road.*
- including a Public Acquisition Overlay (PAO2: Strzelecki Highway Deviation) in favour of VicRoads over the proposed Strzelecki Highway Deviation between the Morwell-Thorpdale Road, Driffield and Drilling Depot Road, Morwell;
- deleting the Land Subject to Inundation Overlay over the existing Morwell River floodplain from where the Morwell River is being diverted.

In the Explanatory Report for Amendment C32, the purpose of the amendment is described as follows:

> *"The amendment is required to facilitate various matters associated with the IPRH West Field Project. These matters include the deviation of the Strzelecki Highway, the closure of the various roads and the diversion of the Morwell River and Eel Hole and Wilderness Creeks."*

The Explanatory Report sets out the impacts of the amendment, planning permits and the IPRH West Field Project as a whole, and lists the headings under which these impacts have been addressed in the EES.

The submission by Latrobe City Council, the Planning Authority, on the EES (LCC#2) expressed support for the IPRH proposal in general terms, and pointed to planning provisions in the Latrobe Planning Scheme, which supported the proposals. Substantial opposing submissions to the Amendment and EES were made by EDO and HRL, while four other submissions opposed to the proposals were also received.

At the outset, Council noted that the proposed EES, Amendment C32 and the planning permits all relate to the river diversion and road relocation. The existing mining operation and the power station are not the subject of the approval process (The Panel must point out here that while this last assertion is true, the EES and proposed Mining Licence application relate to the extension of MIN5004 and the winning of coal in that proposed mining licence area for the purpose of suppling fuel to the Hazelwood Power Station). In relation to EDO's submission, Council listed five points made by EDO, and responded as follows:

Concern about the scope of the assessment Not considered relevant for Latrobe City to consider as the Minister for Planning has established the scope of the assessment.

Greenhouse impacts and water use Deemed by Council to be in relation to the existing mine and power station, and therefore outside the scope of the assessment.

Inconsistency with the Renewable Energy policy found at s.15.14 of the Latrobe Planning Scheme Council considers the policy to encourage renewable energy rather than to discriminate against brown coal, and considers the argument by EDO irrelevant.

Economic effect on the community Addressed in the EES by the Economic and Social Impacts study by Sinclair Knight Merz.

Electricity generation The EDO focus their arguments on electricity generation rather than the river diversion and road relocation proposal being considered. Their views, which accept the cessation of power generation, fail to consider the consequences on the regional economy and its community and the nationwide industrial sector impacts of a shortfall in electricity generation or higher electricity costs of production.

In relation to the submission made by Clayton Utz on behalf of HRL, Council responded as follows:

> *"HRL state their interest as the holder of exploration licences and the proponent for the development of a new 800 MW power station using coal gasification technology on land within the exploration licence area. The proposed fifth Morwell River diversion, the Strzelecki Highway deviation and the Wilderness Creek diversion in relation to HRL's exploration is generally along the eastern boundaries of those licences. HRL do not have any material proposals on which the impacts of the river diversion and road relocation impact. Consequently, their arguments in relation to economic impact, future available cost resource, subsidence, cost of generation, greenhouse emissions and movement of infrastructure, particularly transmission lines are not considered relevant matters for consideration of the proposed river diversion and road relocation which is the matter of the EES, Amendment C32 and the planning permits."*

Council considered four other objections to the EES, and did not consider them to be objections to the Amendment or Permits.

Late in the Initial Panel proceedings, Stephen Davis submitted the "IPRH Response to HRL Planning Submission" (IPRH#47). While addressing matters relating to the Strategic Assessment Guidelines previously listed in the submissions by Council (LCC#2, attachment 2), and on behalf of HRL in the submission to the Panel by Lew Sayer on Amendment 32 (HRL#9), Mr Davis submitted that:

> *"(a) the Panel's job in assessing strategic justification of the Amendment is relatively simple. The Amendment facilitates VicRoads requirements for road closures (the RXOs) and road acquisition (PAOs) and an administrative tidying up of a redundant overlay (d-LSIO). There is a clear policy basis for these relatively minor matters and the Panel should not look into the level of detail three steps removed from the matters the subject of the Amendment which HRL appears to be suggesting the Panel do; and*
>
> *(b) given that mining and power generation (industry) are Section 1 uses in the underlying Special Use Zone Schedule 1 (SUZ1) of the subject land, the Panel ought not to consider or give much weight to policy relating to the mining process or power generation given the Amendment does not change the SUZ1 or permit anything to be done which cannot currently be permissibly done (namely mining or power generation).*
>
> *(c) In any event, it is submitted that the weight of policy supports the Amendment and that the policy statements adduced by the objector apparently to argue that the Amendment is not justified have each been countered in the above submissions."*

Later evidence by Latrobe City Council (LCC#5) took the form of a letter to IPRH dated 13 August 2004, in which, under the heading "The Strategic Assessment Guidelines" states:

> *"Council concurs that the Amendment is essentially administrative in nature dealing with "tidy-up" matters for the Latrobe Planning Scheme should permissions be given under the EES process. Given the nature of the West Field Project proposal it is considered more appropriate to deal with the strategic issues through the EES process. The Assessment Guidelines do have relevance in that they provide a framework for fundamental questioning such as have the appropriate Victoria Planning Provision tools been applied? The amendment seeks to apply tools and remove controls as are appropriate, rather than rely on the existing provisions thus improving the clarity of the Scheme.*
>
> *The Guidelines reinforce the Victorian Planning Scheme principle that a fundamental consideration in any planning scheme amendment is planning policy and essentially this is measured through addressing the question of Is the Amendment Strategically justified? Council has submitted their assessment to the EES Panel in which the State Planning Policy Framework, Municipal Strategic Statement and local policies were considered. The IPRH response is considered to not be inconsistent with Council's conclusions."*

FURTHER CONSIDERATIONS FOLLOWING THE VCAT ORDER

The VCAT order relating to the greenhouse gases arising from the burning of Phase 2 West Field coal in the Hazelwood Power station has been reported above in Section 3.5, and the procedural steps and subsequent analysis resulting from the order has been reported in Sections 3.6, 4.3, 18 and 22.2 above.

Latrobe City Council made a further submission on 17 January 2005 (Submission No 13), but did not give further verbal submissions to the reconvened Panel Hearings, nor did it submit a revised response to the Strategic Assessment Guidelines. Submission No 13 stated that Latrobe City remains committed to supporting the development of Hazelwood's West Field project, and lists its reasons for doing so. These reasons have been canvassed in the Panel report previously, and can be summarised as:

- acceptance that the use of the brown coal does produce high levels of greenhouse gas emissions;
- recognition that the conflict between the importance of the competitive nature of brown coal as a fuel and the high cost of significant levels of greenhouse gas abatement needs to be addressed;
- at the time of privatisation, Latrobe City shared with International Power an expectation of a 30–40 year life for Hazelwood, a significant contributor to an industry which is a major element of the economy;
- satisfaction with the efforts of International Power's efforts and strategies to reduce emissions within the constraints of commercial reality;
- major breakthroughs and/or major investment in greenhouse gas abatement cannot be expected within the realms of normal operation. The support strategies and extensive research and development required is not the responsibility of the generation industry alone, and certainly should not be regarded as an imposition on the development conditions of the West Field;
- the current need in Victoria for continued base load generation capacity;
- concern about the implications for investment and sovereign risk if the proposal was refused.

Strategic Assessment Guidelines were prepared for IPRH by Matrix Planning (see IPRH#7), and were reviewed and resubmitted prior to the reconvened Hearings (Attachment A to IPRH#5). The Panel questioned Mr Andrew Clarke of Matrix Planning concerning his assertion, under the heading "1.3 *Planning and Environment Act—Does the amendment adequately address environmental effects?*" that:

> *"The amendment forms part of an environmental effects statement process. The amendment was publicly exhibited with the environment effects statement that addressed all relevant environmental effects of the coal mine expansion. The conclusion drawn is that there is adequate amelioration of all potential adverse environmental impacts associated with the proposal."*

In particular, the Panel questioned how this statement could be correct when the EES included no analysis of the greenhouse gas emissions from the HPS.

Subsequently IPRH submitted a revision of Attachment A by email (after the conclusion of the Hearings). The response under Section 1.3 was expanded to two pages in length, and argued, in part:

> *Greenhouse policy is still being formulated by both Australian federal and state governments and no clear policy statements exist to support what might be expected of existing electricity generators using brown coal as a fuel source other than those enunciated in recent initiatives such as the Victorian Government's Brown Coal Tender and the position paper Greenhouse Challenge for Energy (DSE/DPI, 2004). The Victorian Government has requested IPRH meet the requirements of the Brown Coal Tender in assessing coal outside its current mining licence. The tender required successful bidders to, as a minimum, achieve abatement in accordance with the requirements of the Generation Efficiency Standards (GES), which is a program that requires the application of current best practice to the reduction of greenhouse gas emissions for the type of fuel and age of plant."*

Following the process and timelines agreed at the close of the Hearings, EDO made a further submission on the revised IPRH Strategic assessment Guidelines on 14 February 2005 by email (EDO#19). The EDO submission included comment that the authorship of the amended version was not clear; that the author's views on what the law should be, instead of what the law is as interpreted by VCAT, are not relevant; that replacement options for HPS rely on market conditions; the interpretation of Brown Coal Tender requirements; and the timeframe for coal drying technology. The Panel has had the opportunity to review this latest submission by EDO and has come to its own conclusions as set out throughout this report.

The Panel did not have an opportunity to test the accuracy of the assertion in the revised IPRH Strategic Assessment Guidelines that the Brown Coal tender required conformance with "*current best practice …for the type of fuel and age of plant*". The Panel preferred the advice of the Department of Primary Industries (see Section 18.1.1 above), and the Panel's understanding formed through evidence and discussion throughout the entire Hearing process that the Brown Coal Tender aimed to achieve a greenhouse gas intensity level of below 0.85 tonnes CO_2/MWh, representing a 30% improvement if greenhouse gas intensity per MWh compared with the current best available commercial generation from brown coal, and roughly equivalent to the greenhouse gas intensity per MWh of current best available commercial generation from black coal.

The Panel considers the high level of greenhouse gas emissions associated with the burning of brown coal at the HPS to be a major environmental impact, and does not consider the ameliorative measures proposed in the Deed to significantly reduce the level of impact. As

described in Section 22.2 above, however, the environmental impact of greenhouse emissions needs to be weighed against other social and economic considerations. It is this weighing of the overall impacts that makes the proposal, on balance, acceptable in the short term.

In other respects, the Panel generally accepts the thrust of Mr Clarke's submission. Specifically it supports the view that SPPF Clause 15.12 (Energy Efficiency) addresses energy use (rather than generation) and that Clause 15.14 (Renewable Energy) seeks to increase the proportion of energy from renewable sources (especially wind energy) while recognising that fossil fuels are likely to remain the cornerstone of Victoria's energy production for many decades.

22.4.2 PLANNING PERMIT APPLICATIONS 04189, 04190, 04191 AND 04192

Planning permit applications 04189, 04191 and 04192 each request a two-lot subdivision, to allow IPRH to purchase that part of title of farming land that IPRH is seeking to acquire. The Panel considers that the applications raise no significant issue and are consistent with the Decision Guidelines, in particular that relating to existing use and possible future development of the land and nearby land. The Panel supports the Planning Permit conditions proposed by the La Trobe Planning Authority.

Gippsland Water advised that it did not object to the granting of the permits providing the following condition was imposed:

> *"Any plan of subdivision of the subject land lodged for certification shall be referred to the Central Gippsland Region Water Authority under Section 8(1) of the Subdivision Act 1988."*

Condition 4 of the draft exhibited conditions satisfies the Gippsland Water requirements.

Planning permit application 04190 seeks approval for works for the purposes of diverting the Morwell River, Wilderness Creek and Eel Hole Creek. The HRL objection to the Permit Application 04190 relates in significant part to the impact that the river and stream diversions will have on the future coal resource available to it. Other wider grounds relating to efficiency of the use of the brown coal quarantined by MRD5 have also been raised, and policy grounds for them have been included in the submission by Lewis Sayer of WSC Planning Pty Ltd on behalf of HRL (HRL#9). These issues have been discussed in Chapters 8 and 10 above.

22.4.3 DISCUSSION ON PLANNING PERMIT APPLICATION 04190

Two preliminary issues require discussion to preface substantiative consideration of the application.

The area covered by Planning Permit 04190

The application is not accompanied by any further description of the works, and is not accompanied by any plan, save for a general aerial photo labelled Figure 1.2, "Hazelwood Mine and West Field Project area".

The Explanatory Report describes the planning permit in these terms:

> *"Works outside the existing and proposed mining licence area to accommodate the diversion of the Morwell River, Wilderness Creek and Eel Hole Creek."*

The Notice in the Victorian Government Gazette (see LCC#6) relating to the Amendment C32 and the four planning permit applications refers to the planning permit applications seeking permission for, inter alia:

> *"(a) Works outside the existing and proposed mining licence area to accommodate the diversion of the Morwell River, Wilderness Creek and Eel Hole Creek."*

A similar description is contained in LCC#2, page 12.

IPRH have described the area subject to the Planning Permit application in different terms, both in the EES and in submissions to the Panel. In the EES, Section 2.2.3 states:

> *"Thus, no planning permit is required for the mining itself. Planning permits will be required to subdivide land required for the Strzelecki Highway Deviation, Fifth Morwell River Diversion and Eel Hole Creek Diversion and for the stream diversion construction works outside IPRH's current mining licence. Inside IPRH's mining licence area the Hazelwood Mine work plan, which is to be varied for Phase 2 of the West Field Development, provides the necessary approval for the road and stream construction works."*

while Section 2.2.5 states:

> *"The road deviation and stream diversion works and West Field mining operations within the current and proposed mining licence areas will be subject to approval under a work plan prepared in accordance with the requirements of the Mineral Resources Development Act.".*

IPRH contended at the Panel Hearing that the permit area is all that part of the river and creek diversion works outside of MIN5004.

The clearest representation of the river and creek diversion works and the existing and proposed mining licences is shown on IPRH 37 (b), "Existing and Proposed Tenements", which is shown as Figure 11 (see Section 10.1.1 above).

It should be noted in reading Figure 11 that area shown in pink as the Hazelwood Exclusion Zone is the area to which the proposed Mining Licence applies.

Three sections of MRD5 (in the north east section, again near Golden Gully Road and at the south end) are within the proposed Mining Licence Area, as is almost all of the Eel Hole Creek diversion, and a very small part of the Wilderness Creek diversion.

Because a Mining Licence and Work Authority obviate the need for a planning permit for such works, the areal extent of the proposed planning permit is significant. The Panel cannot interpret the application in any way different from the exhibited application, as defined in the Government Gazette and Explanatory Report. This has implications for continued mining in the event that the proposed Mining Licence is not granted, in that a separate Planning Permit application would be needed to cover river and stream diversion works in those areas within the proposed Mining Licence area.

As the Panel's views on this matter were not put to IPRH at the hearings, the Chairman wrote to Enesar on 29 September 2004 after the Initial Hearing, advising of the Panel view, and seeking any comment that Enesar (on behalf of IPRH) might wish to offer. Mr Barton Napier replied to the Chairman on 7 October, confirming that the Panel's view was shared by IPRH.

The scope of Planning Permit 04190

The purpose of the works is for the diverting of the Morwell River, Wilderness Creek and Eel Hole Creek to allow for the mining of the brown coal within Phase 2 of the West Field Project. Justice Morris' order in relation to Amendment 32 must be seen to include the Planning Permits sought under Section 96A of the Planning and Environment Act 1987, which provides for planning permits applications in conjunction with a planning scheme amendment, where they are relevant. The impacts of the proposed river and stream diversions have been generally considered in Chapter 11, flora and fauna impacts have been considered in Chapter 13, noise and air quality impacts have been considered in Chapters 15 and 16, greenhouse gas emissions from construction have been considered in Chapter 17, greenhouse gas emissions from burning the coal made accessible by the river diversion have been considered in Chapter 18, and environmental management has been considered in Chapter 21. The Panel's overall conclusion on the merit of the proposal is addressed in Section 22.2 above.

The relevant strategic issues have been covered in the considerations above. The draft conditions submitted with the exhibition of the permit are supported, save for some further consideration of the arrangements for environmental management as detailed in Chapter 21, and as necessary to detail the Net Gain offsets. In this respect, Enesar has suggested a form of wording to be included as a condition, and that suggestion, endorsed by DSE with minor amendment (in bold below), should be included as a condition as follows:

> *"The proponent is to prepare **and implement a native vegetation offset** program, to the satisfaction of the Secretary of the Department of Sustainability and Environment, to achieve a 'net gain' biodiversity offset in accordance with the requirements of 'Victoria's Native Vegetation Management – A Framework for Action' and any associated guidelines, for the removal of native vegetation for the proposed works."*

Enesar based their recommendation on experience they had gained working with the relevant authorities on the Basslink Project, and taking into consideration the further development of the Net Gain procedures since the approval of Basslink.

Enesar further recommended that a similar condition be included in the Work Plan variation under the MRD Act for stream diversion and road deviation works inside IPRH's existing mining licence. The Panel supports this approach, noting only that respect to the Work Plan under the proposed Mining Licence, the condition would also need to cover Net Gain offsets arising from the mining itself.

Alan Freitag, Manager, Planning and Development, DSE Gippsland Region, set out some useful advice on the responsibilities for Net Gain offset of various Government agencies in a letter to the Panel dated 9 September 2004, as follows:

DSE

- Responsible for providing technical guidance and local knowledge during the development and implementation of the native vegetation offset plan;
- Responsible for endorsing the native vegetation offset plan as being to its satisfaction.

LCC

- Responsible for approval or refusal of Planning Permit Application No 04190 for works (including native vegetation removal) for the purpose of diverting the Morwell River, Wilderness Creek and Eel Hole Creek;

- Responsible for ensuring IPRH obtain DSE endorsement of the native vegetation offset plan, in order to ensure compliance with permit condition;
- Responsible for monitoring of implementation and enforcement of the permit condition – should non-compliance occur.

DPI

- Responsible for approval of Work Authority and Work Plan and granting of a Mining Licence;
- Responsible for ensuring IPRH obtain DSE endorsement of the native vegetation offset plan, in order to ensure compliance with the Work Plan condition
- Responsible for monitoring of implementation and ensuring that the requirements of its approvals are complied with.

WGCMA

- Responsible for providing technical guidance and local knowledge during the development of the native vegetation offset plan;
- Responsible for advising DSE of its endorsement of the native vegetation offset plan as it applies to works within the river reservations.

Minor changes to the conditions on Permit 04190 were discussed and accepted by the Planning Authority, namely putting Condition 2 (about the expiry of the permit) last, detailing the authorities with whom Latrobe City Council will liaise before approving the works plans (see Condition 3), and the addition of Gippsland Water to the list of authorities in Condition (4).

22.4.4 PLANNING APPROVAL FOR YINNAR ROAD DEVIATION AROUND THE CEMETERY

The merits of deviating Yinnar Road near the Cemetery are discussed in Section 12.3.

As the proposed deviation is covered in part by Special Use Zone Category 1 (SUZ1), and in part by Public Park and Recreation Zone (PPRZ), in both of which a permit is required to construct a road, either IPRH or Latrobe City Council will need to apply for a permit to construct the deviation in due course. As the proposal may affect the interests of recreational users, it is anticipated that the permit would be advertised.

22.4.5 CONCLUSIONS ON THE PLANNING SCHEME AMENDMENT AND PERMITS

The Panel concludes that Amendment C32 should be adopted and Planning Permits 04189, 04190, 04191 and 04192 should be granted, subject to any requirements flowing from the Minister's Assessment, following consideration of the Panel Report and the conclusion of the separate process in relation to greenhouse gas emissions from HPS, and with minor amendment to the proposed conditions on 04190 relating to Net Gain, other social issues and environmental management (see Sections 11.2.4, 19.5 and 21.2.2).

22.4.6 RECOMMENDATION ON THE PLANNING SCHEME AMENDMENT AND PERMITS

The Panel recommends that:

- **the adoption of Amendment C32 and the granting of Permit Nos. 04189, 04190, 04191 and 04192, subject to any requirements flowing from the Minister's Assessment, following consideration of the Panel Report and the conclusion of the separate process in relation to greenhouse gas emissions from HPS. Minor amendment to the proposed condition on 04190 relating to Net Gain offsets are specified below, and earlier recommendations relating to the agreement for handing over the completed river diversion, other social issues and environmental management should be consolidated (see Recommendations on Stream Diversions, Section 11.2.5, on Other Social Issues, Section 19.5 and on Environmental Management, Section 21.2.2).**
- **additional conditions to Permit No 04190 to provide that:**
  - **the proponent is to prepare and implement a native vegetation offset program, to the satisfaction of the Secretary of the Department of Sustainability and Environment, to achieve a 'net gain' biodiversity offset in accordance with the requirements of 'Victoria's Native Vegetation Management – A Framework for Action' and any associated guidelines, for the removal of native vegetation for the proposed works;**
  - **the updated PEMP is to be referenced in the permit.**

22.5 THE ENVIRONMENT PROTECTION ACT 1970

EPA has determined that the West Field Project will require a Works Approval under the *Environment Protection Act 1970* for the discharge of waste from the construction of the road deviation and stream diversion works. To satisfy the requirements of the Protocol for Environmental Management (Greenhouse Gas Emissions and Energy Efficiency in Industry), the Works Approval application incorporates an emissions inventory of the road deviation and stream diversion construction works. IPRH have applied for the Works Approval WA55174.

EPA made a detailed submission on the exhibited documents, and made a further presentation to the Panel. EPA drew attention to the fact that IPRH is an accredited licensee, reflecting its demonstrated high level of environmental performance and a commitment to improvement; its adoption of environmental management systems, including audit programs; and its effective community consultation.

While the issue of the discharge of contaminated stormwater resulting from the Morwell River diversion triggers the need for the Works Approval, the application also covers matters such as dust and noise emissions that will occur from the river and road diversion construction.

EPA advised that ongoing mine and power station operations are not dealt with under the application WA55174. At some time in the future it may be necessary, due to the development of the West Field, to further relocate the waste discharge point from the Hazelwood Mine to the Morwell River. Further, the gradual increase in area of the mine as the mine develops will increase the quantity of stormwater gathered within the mine. At some point in time, the current licensed discharge volume may need to be increased. Either of

these changes may also require a Works Approval, but they are not included in the present application and so will not be considered in the EPA Works Approval Application 55174.

EPA's submission deals with the following topics, and their treatment in this Panel report is shown in brackets after each topic, as follows:

- Design of the river and stream diversions (Chapter 11);
- Water (Chapter 14);
- Air (Chapter 15);
- Noise (Chapter 16);
- Greenhouse gas emissions from construction (Chapter 17);
- Mine Rehabilitation (Chapter 20);
- Environmental management (Chapter 21).

EPA attached three letters from referral agencies, these being Southern Rural Water (**SRW**), VicRoads and West Gippsland Catchment Management Authority (**WGCMA**).

SRW stated that their responsibility is to manage the Latrobe Valley Mines' groundwater licences and to ensure the works do not have unacceptable impacts on surface and groundwater resources. Its concerns related to groundwater extraction from the deeper aquifers, necessary to keep the mines dry, while expressing concern that at the cessation of mining the mines should be sealed so that groundwater cannot discharge through the aquifer confining layers.

The Panel understands that resolution of this issue must await further investigations about the connectivity of the various groundwater aquifers, and the precise scenario adopted at the cessation of mining (see Chapter 20). In any event, it is not an issue for the EPA Works Approval.

WGCMA referred to its involvement in the process leading to the preparation of the EES for West Field. The role of Dr Bob Keller in peer reviewing the design assumptions and functional design process for MRD5 as a representative of the WGCMA has been detailed in Chapter 11. WGCMA offered no comment on the WA55174. The WGCMA stated in its letter to the EPA:

> *"The design has just commenced and my Authority will be continuing to work with the designers to achieve a robust design, an agreed environmental management process for construction and commissioning of the works, and an appropriate bond arrangement.*
>
> *When this work has been completed to our satisfaction, WGCMA will be in a position to grant work approval."*

The responsibilities of the WGCMA under Section 67 of the Water Act 1989 are considered in Section 22.6 below. The Panel understands that the advice of the WGCMA to EPA quoted above relates to those responsibilities.

22.5.1 CONCLUSIONS ON THE WORKS APPROVAL APPLICATION WA55174

The Panel concludes that the issues raised by EPA can be accommodated in the Works Approval WA55174, and the detailed conclusions and recommendations in Chapters 11, 14, 15, 16, 17, 20 and 21 relevant to the Works Approval, should be taken into consideration by EPA.

22.5.2 RECOMMENDATION ON THE WORKS APPROVAL APPLICATION WA55174

The Panel recommends that the EPA takes into consideration those detailed recommendations of the Panel in Chapters 11, 14, 15, 16, 17, 20 and 21 which are relevant to the Works Approval before it is finalised.

22.6 THE WATER ACT 1989

The EES states in Section 2.2.2:

> *"IPRH will require a licence under Section 67 of the Water Act 1989 to construct works to divert the Morwell River, Eel Hole Creek and Wilderness Creek. The advertisement and review provisions of Sections 65 and 66 of that act will be met by the EES process. The licence will be issued by the West Gippsland Catchment management Authority if the stream diversions are approved and will include a warranty period and bond. The duration of the warranty period will be linked to performance criteria for the stream diversions."*

The WGCMA made a written submission on the exhibited documents, and expressed satisfaction with work done by IPRH and their consultants on the issues for which WGCMA had indicated its requirements during the preparation of the EES, namely the stream diversion, vegetation, land use and flooding. WGCMA further advised in its written submission:

> *"The WGCMA is to be similarly involved in the design, construction, commissioning and maintenance of a number of key elements of the project. The stream diversions, riparian vegetation, offset plantings and protection of remnant stands, flooding issues and water quality are main areas of interest. It is anticipated that the CMA's potential risks will be managed by a Memorandum of Understanding and bond arrangement with IPRH."*

At the Directions Hearing, EDO submitted that the Panel should have been appointed under the Water Act to meet the "advertisement and review provisions of Sections 65 and 66". DSE provided advice to the Panel that such appointment was not contemplated.

As mentioned previously, Dr Bob Keller made a presentation to the Panel on behalf of the WGCMA, and his presentation has been addressed in Chapter 11 above. His evidence did not, however, relate to the issue of a Water licence under the Water Act.

The comments of WGCMA to the EPA in Section 22.5 above about the continuing design work prior to work approval, suggests that the issue of the licence under the Water Act is not imminent. While the Panel's review of the work done to-date is addressed in various parts of this report, the Panel has received no particular advice from WGCMA on the Water Act licence, and is not in a position to make any specific recommendation about it.

22.6.1 CONCLUSIONS ON THE WATER ACT LICENCE

The Panel concludes that the issue of a licence under the Water Act is not imminent. No evidence about it has been presented to the Panel, and hence the Panel is not in a position to make any findings or recommendations.

22.7 THE EPBC ACT

Section 13.3 above addresses the EPBC reference and issues relating to threatened species and recommendations are made in Section 13.5 above.

Section 14.3 above addresses the impact on surface water and aquifer pumping on the Ramsar Wetlands of the Gippsland Lames, and conclusions are provided in Section 14.3.3.

While the controlling provisions of the EPBC referral was the presence of nationally listed threatened species, the EPBC Act provides for the holistic assessment of controlled actions — here the extension of the Hazelwood mine. Section 133 provides, amongst other things, that before granting approval, the Minister must receive a notice from the State conforming to the requirements of Section 130(1B)(b). This latter section requires "(i) stating that the certain and likely impacts of the action on things other than matters protected by the controlling provisions for the action have been assessed to the greatest extent practicable; and (ii) explaining how they have been assessed." It is understood that it is current practice for Victoria to give such advice to the Commonwealth on matters where the EES process has been accredited for the purposes of the EPBC Act.

Section 136 of the EPBC Act lists matters that the Minister must consider, and these include the principles of ecologically sustainable development, as specified in the Section 3 of the Act.

These are:

- *decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
- *if there are some threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
- *the principle of inter-generational equity — that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
- *the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
- *improved valuation, pricing and incentive mechanisms should be promoted."*

Overall, while the provisions of the EPBC Act and the Commonwealth Minister's assessment are directed primarily to the matters of national environmental significance on which a nomination was based, it provides a degree of security that the accredited process will meet the principles of ecologically sustainable development.

Following the VCAT order, the Panel process has included consideration of greenhouse gases from the Hazelwood Power Station. The Panel has now considered all the significant issues surrounding the proposal. Consideration of the Panel's recommendations, and the subsequent assessment by the Victorian Minister for Planning, can provide the basis for the State to be able to satisfy the requirements of Section 130(1B)(b) of the EPBC Act.

22.7.1 CONCLUSIONS ON ASSESSMENT UNDER THE EPBC ACT

The Panel concludes that the requirements of Sections 130 and 133 of the EPBC Act can be satisfied through a combination of consideration of the Panel's conclusions and recommendations, and the conclusion of the separate process on power station greenhouse gases.

22.7.2 RECOMMENDATION ON ASSESSMENT UNDER THE EPBC ACT

The Panel recommends that notice from the State to the Commonwealth Government relating to the requirements of Sections 130 and 133 of the EPBC Act can be satisfied through a combination of consideration of the Panel's conclusions and recommendations and the conclusion of the separate process on power station greenhouse gases, leading to the Minister's Assessment.

23. STRATEGIC ASSESSMENT GUIDELINES

As part of its assessment of Amendment C32 to the La Trobe Planning Scheme the Panel is required to assess the Amendment against the Strategic Assessment Guidelines contained in the General Practice Note on Strategic Assessment Guidelines for Planning Scheme Amendments. A copy of the General Practice Note is included in Appendix F.

The matters to be considered are listed below, along with the Panel's responses.

23.1 IS AN AMENDMENT REQUIRED?

The Amendment is necessary to rezone land presently RDZ1 and RDZ2 to SUZ1, to apply a Public Acquisition Overlay to the proposed new alignment of the Strzelecki Highway and to introduce and apply the Road Closure Overlay (RXO) to specified roads, as set out in Section 22.4.1 above. The outcomes achieved by the planning scheme amendment cannot be achieved, or are achieved less conveniently, by other tools such as a local law or a planning permit.

23.2 STRATEGIC JUSTIFICATION

The amendment is intended to facilitate the mining of brown coal from the identified brown coal area, which is supported by both policy frameworks of the planning scheme. The policy support for the amendment is considered in more detail in Sections 5.1.3, 5.1.4 and 22.4.2 above, together with other sections that detail the ameliorative measures and likely residual impacts arising from the proposal, and upon which the degree to which the policies have been met has been assessed.

23.3 PLANNING AND ENVIRONMENT ACT

Does the amendment adequately address environmental effects and the relevant social and economic effects?

The Amendment C32 is supported by the Environment Effects Statement and the supplementary information exhibited following Justice Stuart Morris' order. Environmental, social and economic impacts have been thoroughly addressed, as detailed throughout the Panel's report, and summarised in Section 22.2 above. The significant impact of greenhouse gas emissions cannot be ameliorated to any great extent in the short term. This negative impact is outweighed by the benefits to the State in terms of the significant contribution that Hazelwood Power Station will continue to make to Victoria's power supply, and the benefits to local economic activity, employment and social cohesion, particularly in those years before

more energy efficient combustion technologies are put into commercial operation for brown coal.

Does the amendment comply with the requirements of the Ministerial Direction on the form and content of Planning Schemes?

The amendment has been prepared in accordance with the Ministerial Direction on the Form and Content of Planning Schemes.

Do any other Minister's Directions apply to the Amendment? If so, have they been complied with?

No other Ministerial Directions apply to the amendment.

Is the Amendment accompanied by all the information required by a Direction?

The amendment has been prepared in accordance with the Ministerial Direction on the Form and Content of Planning Schemes.

23.4 STATE PLANNING POLICY FRAMEWORK

The relevant clauses of the State Planning Policy Framework are listed in Section 5.2 above.

Further clauses were raised by Clayton Utz for HRL, and EDO, and have been considered in Section 22.4.2 above.

Overall, the Panel concludes that the amendment supports the general principles and specific policies contained in the SPPF.

23.5 LOCAL PLANNING POLICY FRAMEWORK

The relevant local policy framework is set out in Section 5.3 above.

The amendment is consistent with, and supports the provisions of, the Municipal Strategic Statement and local planning policies, and no changes are proposed to the MSS or to local planning policy.

23.6 ZONES, OVERLAYS AND SCHEDULES

The zones and overlays are the most appropriate tools, as noted in Section 23.1 above, and the VPP Practice Notes have been applied to the extent that they are relevant.

23.7 REFERRAL AUTHORITIES

No new formal or informal referrals arise as a result of the amendment.

23.8 OUTCOME OF THE AMENDMENT

What is the cumulative effect of this amendment on the strategic directions of the planning scheme?

The effect of the amendment is to remove statutory impediments to the mining of brown coal in identified Category A brown coal areas, which is clearly supported in the planning scheme.

The strategic direction of the planning scheme is unaltered.

Are the amendments and the desired outcomes clear?

The amendment removes impediments to the mining of brown coal.

24. CONCLUSIONS & RECOMMENDATIONS

24.1 CONCLUSIONS

The Panel has considered all the submissions referred to it and all the material presented at the hearings and has reached the following conclusions.

Approach adopted by Panel

The Panel has concluded that, as a direct consequence of Justice Stuart Morris' order, and contrary to the Minister's Terms of Reference, it must consider the impacts arising from the burning of brown coal from Phase 2 of the Hazelwood West Field Mine in the Hazelwood Power Station comprehensively in relation to the EES and all the approvals sought, to the extent that the emerging government policy, and the detailed information provided by the proponent and government, allows.

To the extent that the Panel's conclusions and recommendations are not able to, and do not, fully consider the outcome of the separate process on greenhouse gases from Hazelwood Power Station, the comprehensive assessment required for he West Field Project can be undertaken providing the Minister's assessment includes consideration of both the Panel's report and recommendations and the results of the separate process on the emissions of greenhouse gases from the power station.

Preliminary matters

The Panel has concluded that the provision of additional time to allow HRL to prepare its Expert Witness Statements has substantially overcome the potential difficulty of insufficient time.

The Panel has concluded that the eventual referral of submissions by the Planning Authority to the Minister, and the subsequent appointment of the Panel under Sections 153 and 155 of the Planning and Environment Act 1987, has overcome the procedural problems that would have otherwise arisen.

The Panel has concluded that it is empowered to provide advice to the WGCMA under its Terms of Reference, and it is able to do so, notwithstanding that it has not been separately appointed under the Water.

The Panel was impressed with the high quality of the EES, and IPRH's efforts to thoroughly examine issues relating to the proposal. The Panel commends IPRH for its openness, diligence and competence in providing information to the Panel to assist the Panel in coming to its conclusions.

The Panel believes it desirable for DPI to review the Guidelines for ERC's, particularly with reference to the ambit of their considerations. The issues that will most effect communities are off-site effects, and it is essential that the ERC provide a forum where these issues are

reviewed. Many of the commitments for ongoing design, implementation and monitoring made by IPRH and the requirements of approval authorities affect areas outside the IPRH mining licence boundary, and the boundary of the proposed new mining licence. For these commitments and requirements to be properly reviewed by the ERC, it is essential that a mechanism be found to remove the present restriction in the guidelines.

The Panel supports the proposal by IPRH to broaden the community membership of the ERC, provided that the procedures currently in place are reviewed to ensure that community membership represents a variety of community views.

Meeting future electricity needs

Given the lead-time for alternative technologies, the absence of significant demand management in an environment of low electricity prices, and the expected increase in annual electricity demand, the Panel concludes that the IPRH proposal for the West Field development is the most economical alternative for the supply of base load electricity to Victoria and the National Electricity Market.

The Panel commends the Government for its initiatives with respect to new technologies and the granting of exploration licences in conjunction with defined investment programs for new technology research and implementation.

The Panel concludes that Government should intensify its promotion and the use of economic incentives to achieve a significant strengthening in demand management, and should seek a review of the operation of the National Electricity Market to ensure that its objectives lead to a balance between:

- ensuring the National Electricity Market enjoys a secure, clean and reliable base-load electricity supply well into the future; and,
- maintaining competitive electricity prices for domestic and business consumers.

The most efficient use of brown coal

Taking into consideration the current and future needs, the size of the brown coal resource, and the opportunity for increased efficiency from Hazelwood in the future, the Panel concludes that the proposal is an appropriate use of the Gippsland brown coal resource.

River diversion and mining options

The Panel endorses the selection of MRD5 by IPRH in favour of other possible river diversions. In relation to the mining method, the Panel accepts that it is presently economic to maintain the bucket wheel excavator operation, and notes that a shift to partial dozer operations is likely as new plant is required.

Interface issues with HRL

The Panel concludes that it is entirely reasonable for IPRH to seek approval for the location of MRD5 and the relocation of the Strzelecki Highway in the manner set out in the EES. The mining legislation, the planning framework and past experience support the view that infrastructure can appropriately be sited on land covered by exploration licences held by third parties.

The Panel considers IPRH to have been quite fair in its communications with others, including DPI and HRL. Any failure in communication might be attributed in part to the past focus of HRL, which was understandably on developing their process rather than considering the practical aspects of mine development, and the desire of DPI not to open itself to any charge of a lack of probity in the tender process. Certainly DPI had the opportunity to clarify the boundary issue prior to finalising the Exploration Licences with HRL.

Having said that, the Exploration Licences awarded to HRL do not confer on HRL any right to access to the coal within the tenements unfettered by infrastructure. A key principle in deciding who should pay the future costs for relocating infrastructure, including the future replacement of MRD5 (presuming it is constructed by IPRH in the next few years), is that costs should be borne by the parties to whom benefit accrues at the time of relocation.

Following the resolution of the present IPRH proposal, it would seem desirable for DPI to assist the parties to coordinate their future planning, as may be necessary, and to the greatest extent possible, so that the State's objective for full coal recovery across the boundary is achieved.

The proposed Fifth Morwell River Diversion

With respect to the proposed Fifth Morwell River Diversion and the diversions of the Eel Hole and Wilderness Creeks, the Panel concludes that the location, design and construction processes are satisfactory. From an environmental point of view, the Panel is of the opinion that the proposal for the MRD5 is far superior to the currently operational MRD2 (which relies upon an underground concrete drain for low level flows with minimal treatment of the grassed flood way channel) and allowing for the fact that it will be 'man-made', it will be a reasonable facsimile of a natural water course. The same comment applies to the Wilderness Creek diversion that replaces a degraded section of this stream. The design retains part of Eel Hole Creek that has a high environmental value and complements this with a high quality diversion.

In order to proceed, a satisfactory agreement is required between the West Gippsland Catchment Management Authority and IPRH to monitor the design and construction and to define the criteria for the hand-over of the diversions once construction and rehabilitation is complete. The Panel is of the view that an ongoing peer review process and the relevant sections of the Construction Environmental Management Plan should form the basis of this agreement and that the agreement should be included as a condition in the Work Plan and the relevant Planning Permit.

Traffic and transport

With respect to the alignment and configuration of the Strzelecki Highway deviation, the Panel generally accepts the design proposed by the proponent with the following provisoes:

- the vertical alignment between chainages 1400 - 1900 and 4900 - 6100 should be reviewed to consider a lowering of the alignment by up to 3 m and 4 m respectively to reduce earthworks and visual intrusion;
- consideration should be given to the opportunity to view the river diversion and the open cut mine extension by providing a lay-by beside the Strzelecki Highway deviation immediately south of the intersection with Golden Gully Road. A further lay-by at chainage 8700 would provide easy access to a view over the wetlands, and should also be considered.

The Panel also wishes to warn against the addition of ratings used to rank options against particular criteria as used in Table 3.4 of the EES. Such an addition implies no differentiation of importance between criteria, which may not be the case, and could lead to a misinterpretation of the results of an assessment.

With respect to the selection of a replacement for the existing Over Dimensional Route 9, the Panel concludes that a route following Marretts Road, the Strzelecki Highway deviation and Yinnar Road to Hazelwood and then via the existing route should be adopted subject to the adoption of changes to the Latrobe Planning Scheme to accommodate alignment option 4 (the lower route behind the cooling pond foreshore) in the vicinity of the Hazelwood Cemetery.

Flora and fauna

It is doubtful that any of the threatened fish species exist in the reaches of the Morwell River upstream of MRD2. The implementation of MRD5 would allow the opportunity for the species to once again utilise the upper reaches of the river in the longer term.

The Panel concludes that the work undertaken by IPRH, and by Biosis on its behalf, to investigate flora and fauna impacts, and to provide ameliorative measures, has met most reasonable expectations. The Panel notes that there will be ongoing discussions between IPRH and DSE to finalise the Net Gain offset requirements, as is the usual case following project approval.

The Panel supports the negotiated agreement between IPRH and DSE for the undertaking of some limited additional fauna surveys.

The Panel concludes that the studies undertaken, and the Net Gain offsets to be finalised to the satisfaction of DSE, will satisfy the requirements of the *Flora and Fauna Guarantee Act 1988*, *Victoria's Native Vegetation Management — A Framework for Action*, and the controlling provisions of the EPBC Act which have been applied to the project (listed threatened species and communities).

The potential effect of the proposal to reduce rainfall in the catchment of the Gippsland Lakes from anthropogenic emissions of greenhouse gases should be based on up to 357 Mt of CO2-e estimated saving if the Phase 2 of the West Field Development did not occur. The potential increase in global temperature would be between 0.00009◦C and 0.00027◦C in 2030. These increases, and their consequential effect on rainfall events, are still very small, if taken in isolation to other emissions world wide.

Overall, the proposal for the Fifth Morwell River Diversion and the mining within West Field Phase 2 will re-establish a more natural regime for the Morwell River, while the "net gain" offsets and restoration of the riverine system and wetlands should satisfactorily mitigate the impacts of the proposal on flora and fauna, and may improve ecological values.

Groundwater extraction and use

The Regional Groundwater Committee (RGC) plays a key role monitoring ground water extraction and subsidence and this should continue into the future. Clearly, it is essential that all coal extraction businesses should belong to this group and each should contribute its fair share to the costs of operating the group and its monitoring and modelling processes.

IPRH have demonstrated the advantages of the current process of monitoring the performance of the operation of aquifer depressurisation in order to achieve the dual goals of operational safety and minimisation of aquifer extraction. This program must continue in a similar manner until the coal extraction process and the rehabilitation of the mine are complete.

All major structures in the area of influence of major differentials in subsidence should be monitored on a regular basis during the life of the mine and during rehabilitation. The design of the MRD5 and the MRD backwater levee should be subjected to particular care to ensure anticipated ground movements can be handled. The performance of these structures should be reviewed on a more regular basis.

While ground water extraction is significant, there is only minimal (if any) impact on other users.

IPRH's Hazelwood operations have a minor impact on the Latrobe River system through the use of their allocation of 14 GL/year from the Tyers River.

The depressurisation of the aquifers at the Hazelwood mine would not cause any measurable impact on water inputs or levels in the Ramsar wetlands of the Gippsland Lakes.

Air quality and health

The modelling of dust has been based on discussions with the EPA to ensure that the modelling would meet the EPA's expectations in terms of methodology and comparison with a number of standards of air quality. The modelling may have over-predicted the occurrence of exceedances and their levels of dust because of the conservative nature of some of the inputs to the modelling. The use of four measures of dust - PM_{10}, $PM_{2.5}$, TSP and dust deposits - provides sufficient information on which to assess the likely impacts of dust. The modelling results showed that PM_{10} was the only measure of dust where exceedances of the standard were predicted.

Never the less the results show that dust is a potential problem at some residences relatively close to the construction activities in some years. Although the number of predicted exceedances of the PM_{10} intervention level is not high, these occurrences demonstrate the need for an effective dust control strategy. Evidence has been presented that shows that the dust problems can be suitably managed to ensure that dust does not have a serious impact on neighbouring properties. Exceedances are far less likely to occur from mining in the years after the construction activities. The most likely years in which exceedances may occur are those when the mine is closest to the neighbouring properties and overburden removal is a major activity.

The risk assessments performed for silica in dust, which is a causative factor for lung cancer and silicosis, have been thorough and convincing. Like the dust modelling, the risk assessments have been conservative. This especially applies to the assumption throughout the risk assessment procedures that the silica in the dust is fresh crystalline silica. The evidence shows that the silica in the dust expected to be generated by the construction and mining activities is weathered silica. The health impacts shown to be due to silica have been associated with exposures to fresh crystalline silica and not weathered silica.

On the basis of these risk assessments, the Panel concludes that the health impacts on neighbours and the general public are very unlikely to be significant or indeed measurable.

Noise

The Panel has some concerns about the background noise measurements and the methodology used in modelling future noise by IPRH's noise consultant. The use of excessively conservative data, e.g. noise from all equipment being under full load as input to the noise model, is not very convincing. The statement that because of the conservatism, the predicted noise levels are up to about 5 dBA seems to be a sweeping over simplification.

While the general outcome of the noise modelling is that noise is unlikely to be a serious nuisance to neighbours, this is not beyond doubt. For this reason the Panel's view is that the planned monitoring program for the West Field Project needs to be carefully considered. Further manned background measurements should be carried out at sites where exceedances are most likely (BG5, BG6 and BG7), and monitoring of noise arising from the construction and operations should be undertaken in response to complaints until sufficient experience is obtained to use professional judgement augmented by some measurements. Final details of the additional background measurements and the frequency of monitoring measurements should be decided in consultation with EPA.

Greenhouse gas emissions from construction

The assessment of greenhouse gas emissions from the construction of the road and river diversions and from coal mining has been adequately addressed in the EES. Procedures to monitor fuel and electricity use have been identified, as have actions to improve energy efficiency. The nature of the construction and operational activities does limit the opportunity to make large-scale reductions in greenhouse gas emissions through the use of new technologies. Never the less the Panel's view is that some efficiency gains are still possible, especially with the pumping activities associated with the mine, which will continue till mine closure.

Greenhouse gas emissions from Hazelwood Power Station

The Panel accepts that an order-of-magnitude present-value estimate of the discounted financial cost of the impacts of greenhouse gas emissions from HPS over the period 2011 to 2031 (and the effect of those gases in the global ecosystem for many years after that) compared to replacing HPS with a more greenhouse friendly option, might be of the order of $200 million.

Views relating to conditions of sale of HPS to IPR, the uncertainty of whether potential replacements to HPS would yield significant greenhouse advantages in the short to medium term, considerations of sovereign risk, and the likelihood of an emissions trading scheme being implemented at a national level in the medium term, differ substantially. The voluntary agreement between IPRH and government (the Deed) outlined in broad terms to the Panel appears to provide a reasonable way forward in the short term, and is supported by the Panel. Whether 25 Mt CO_2-e emissions savings or some other value is set in the Deed, the CO_2 emissions are directly proportional to the amount of coal burned. It will be essential for the Deed to specify parameters such as the amount of coal that can be used to generate power over the period of the Deed and the average efficiency of generation and the amount of energy to be sent out.

In addition, the setting of future conditions relating to any further coal accessible to IPRH within the mine and its extensions at the end of the period of the Deed should be allowed for.

The Panel would be very concerned if the Deed were completed in such a way that the government had no flexibility in either setting the entry parameters for HPS in a future ETS, or changing those parameters in the light of experience.

In the absence of any comprehensive ETS, continued implementation of the PEM(GGEE) beyond 2006 is seen as essential. The Deed should clarify that the requirements of the PEM(GGEE) and the associated IPRH Action Plans beyond 2006 are additional requirements to the greenhouse gas emissions savings specified.

Monitoring and reporting to improve the current fragmentation and confusion of greenhouse gas reporting, and to clearly report annually the amount of coal used, the average efficiency of generation, the amount of energy sent out, and the average emissions intensity achieved, should be required. To provide for better accountability such requirements should be included in the PEMP and IPRH's annual reports to the community.

Other social issues

The works to implement the proposed river and road diversions and the West Field Mine extension have the potential for major intrusion on the landscape. However, the Panel concludes that IPRH have taken reasonable steps to ameliorate and manage these impacts during the river and road construction processes and to minimise the visual intrusion of the mine to an acceptable level.

To ensure this amelioration is implemented, the measures proposed must be included in the Project Environmental Management Plan.

To ensure the proper protocols relating to Aboriginal sites are followed, these should be included in the Project Environmental Management Plan.

While it is acknowledged that the heritage places in the study area are of low significance individually, the proper protocols for classifying each site and for obtaining the necessary permits or consents should be included in the Project Environmental Management Plan.

Retention of jobs by the extension of the Hazelwood mine is a clear community priority.

Closure of the Hazelwood power station and mine complex in 2009 would be likely to create a high level of unemployment in the Latrobe Valley. Sufficient time is required to develop alternative brown coal to electricity generation to enable the workforce to remain relatively constant.

IPRH is acting in a responsible manner in its dealings with the directly impacted local community. The Panel notes that the Work Authority required under the MRD Act contains requirements for consent and compensation arrangements. With respect to compensation or replacement of public facilities, the Panel would anticipate that IPRH would conclude formal agreements with the Council and the CFA, and these agreements would satisfy the requirements of the Work Authority.

Mine closure and rehabilitation

The long-term view is that the mine void will become a mine lake but the filling of the mine needs to be done in a controlled and measured way over many years. There are a number of significant uncertainties that need to be resolved before a mine closure plan and rehabilitation plan can be finalised.

There is uncertainty about the hydraulic connection between the Morwell and Traralgon aquifers, which has implications for the stability of the mine. Stability is required to prevent the complete collapse of the mine floor and of the batters into the mine void. Water pressure in the deeper aquifers must be stabilised over time, while water pressure within the joints between the coal blocks must be reduced by some form of drainage system that will continue to function well for perhaps hundreds of years into the future.

A further uncertainty is the choice of techniques and practices that will produce the best revegetation outcome for the rehabilitation of the Hazelwood mine. There are many variables that are involved but the objective should be very clear – to produce a stable ecosystem in a highly modified environment, one that requires minimal human intervention to sustain it.

These uncertainties are common to all the miners in the Latrobe Valley. Consequently there appears to be considerable advantages by the industry adopting a co-operative approach with DPI taking a coordinating role to assist in the resolution of the rehabilitation issues.

Despite these uncertainties, IPRH needs to provide an adequate Mine Closure Plan and a Rehabilitation Plan, or agreement on a process to reach this end, in order to achieve a Work Authority from the DPI. The Panel expects that this is more likely to be achieved through a co-operative approach between IPRH and the DPI.

Environmental management

The Panel is of the view that after attention to the matters listed (in Section 21.2) above, the proposed Planning Environmental Management Plan, renamed the Project Environmental Management Plan, will comprehensively detail the various requirements identified at the present stage of the project development, including the requirements for construction (Chapter 7, the CEMP) and operations (Chapter 8, the OEMP). It will evolve throughout the finalisation of the approval process, through detailed design, through the construction of the stream and road diversions, through the mine operation and through the rehabilitation of the mine. The document is a key reference source for the Planning Permit to construct the stream and road works, for the work plan(s) for the extension of the mine, and for the EPA Works Approval.

Approvals

The Panel concludes that subject to the various recommendations made throughout this Panel Report, the impacts associated with the proposal have been properly considered, and in the main can be adequately ameliorated. Although there are some significant impacts which cannot be ameliorated, and some residual impacts after ameliorative measures, these are outweighed by the benefits to the State in terms of the significant contribution that Hazelwood Power Station will continue to make to Victoria's power supply, and the benefits to local economic activity, employment and social cohesion, particularly in those years before more energy efficient combustion technologies are put into commercial operation for brown coal.

The Panel concludes that, providing a satisfactory negotiation on greenhouse gases is concluded, and consideration is given to the recommendations of the Panel that relate to the conditions for mining and ongoing management and monitoring being adopted in either the Mining Licence, the Work Plan or the PEMP as appropriate, the extended Mining Licence to be sought by IPRH can be issued.

The Panel concludes that Amendment C32 should be adopted and Planning Permits 04189, 04190, 04191 and 04192 should be granted, subject to any requirements flowing from the Minister's Assessment following consideration of the Panel Report and the conclusion of the separate process in relation to greenhouse gas emissions from HPS, with minor amendment to the proposed conditions on 04190 relating to Net Gain and environmental management (see Sections 11.2.4 and 21.2.2).

The Panel concludes that the issues raised by EPA can be accommodated in the Works Approval WA55174, and the detailed conclusions and recommendations in Chapters 11, 14, 15, 16, 17, 20 and 21 relevant to the Works Approval, should be taken into consideration by EPA.

The Panel concludes that the issue of a licence under the Water Act is not imminent. No evidence about it has been presented to the Panel, and hence the Panel is not in a position to make any findings or recommendations.

The Panel concludes that the requirements of Sections 130 and 133 of the EPBC Act can be satisfied through a combination of consideration of the Panel's conclusions and recommendations, and the conclusion of the separate process on power station greenhouse gases.

24.2 RECOMMENDATIONS

Based on the reasons set out in this report, the Panel makes the following recommendations:

Recommendation 1

The Panel recommends that DPI reviews the Guidelines for ERC's to ensure that commitments and requirements outside the Mining Licence area are included within the ambit of the ERC.

Recommendation 2

The Panel recommends that the Government should:

- intensify the promotion and provision of economic incentives to achieve a significant strengthening in demand management; and
- seek a review of the operation of the National Electricity Market to achieve a balance between:
  - ensuring the National Electricity Market enjoys a secure, clean and reliable base-load electricity supply well into the future; and
  - maintaining competitive electricity prices for domestic and business purposes.

Recommendation 3

The Panel recommends that:

- the consideration of IPRH's present proposals should not be adversely affected by concerns for the future interests of HRL, as there seems to be no basis for such consideration;
- a key principle for allocating future costs for relocating infrastructure, including MRD5 should it be constructed, is that the costs should be

borne by the parties to whom benefits accrue at the time of relocation; and

- following the resolution of the present IPRH proposal, it would seem desirable for DPI to assist the parties to coordinate their future planning, as may be necessary, and to the greatest extent possible, so that the State's objective for full coal recovery across the boundary is achieved.

Recommendation 4

The Panel recommends that, subject to meeting the statutory requirements spelt out in Chapter 22 of this report:

- the design and construction process for the MRD5 and the diversions of Eel Hole and Wilderness Creeks be accepted, and;
- the West Gippsland Catchment Management Authority and IPRH enter an agreement that sets the criteria for handing over the completed diversions based on a process that utilises the relevant sections of the Construction Environmental Management Plan and the already established peer review process. This agreement should be included as a condition in the Work Plan and the relevant Planning Permit.

Recommendation 5

The Panel recommends that:

- the design of the Strzelecki Highway deviation proposed by the proponent be accepted subject to:
  - the review of the vertical alignment between chainages 1400 - 1900 and 4900 - 6100 to reduce earthworks and the visual impact of the road, and;
  - consideration of providing safe lay-bys at the edge of the Strzelecki Highway deviation to view the river deviation and the mine extension at an appropriate location, e.g. immediately south of the intersection with Golden Gully Road, and to provide easy access to a view over the wetlands at chainage 8700;
- Over Dimensional Route 9 along Marretts Road, Strzelecki Highway Deviation, Yinnar-Driffield Road and Yinnar Road to Hazelwood and then along the existing route be adopted subject to the resolution of a future amendment to the Latrobe Planning Scheme to accommodate alignment option 4 behind the foreshore of the Hazelwood cooling pond.

Recommendation 6

The Panel recommends that in regard to flora and fauna issues, and subject to the statutory conditions and monitoring and management requirements set out in the Recommendations 15 and 18 below, the further limited fauna surveys to be undertaken, and the Net Gain offsets to be finalised to the satisfaction of DSE:

- the requirements of the *Flora and Fauna Guarantee Act 1988* and the requirements under *Victoria's Native Vegetation Management—A Framework for Action* will be met;
- the controlling provisions of the EPBC Act which have been applied to the project (listed threatened species and communities) will be satisfied, and such advice should be provided by the Minister for Planning to the Commonwealth.

Recommendation 7

The Panel recommends that the following matters be included in the Project Environmental Management Plan and that the drafting of the Mining Licence or Work Plan take them into account:

- IPRH continue to develop its aquifer and subsidence monitoring program into the future until completion of the coal extraction process from the West Field Mine and the completion of the agreed rehabilitation program for the total Hazelwood Mine;
- IPRH monitor the structural integrity all major structures within the area of influence of major differential subsidence due to mine and depressurisation activities during the life of the mine and during the rehabilitation of the mine;
- the detailed design of the MRD5 and the MRD5 backwater levee be subjected to particular care and peer review to ensure stability in extreme subsidence situations.

Recommendation 8

The Panel recommends that:

- the spraying of water be the primary control mechanism for the suppression of dust emissions from haul roads;
- real-time continuous monitoring of PM_{10} dust be implemented as an integral part of the dust control strategy, using at least two monitors at dust sensitive locations that are close to the construction activities in each construction season;
- a suitable meteorological station be identified or installed to provide reliable weather data for use in the dust control strategy;
- the data from the real-time monitoring of PM_{10} dust and from the meteorological station be used to validate the model predictions of dust and to improve the forecasting technique of conditions that are likely to produce exceedances of the dust criteria at sensitive receptor sites;
- trigger values of PM_{10} dust and other reliable predictors of exceedances such as meteorological conditions be determined by IPRH, in consultation with EPA, and incorporated into the dust control strategy;
- the air quality performance criteria in the PEMP be expanded to include non-exceedance of the 60 $\mu g/m^3$ PM_{10} 24-hour average level, non-exceedance of the 36 $\mu g/m^3$ $PM_{2.5}$ 24-hour average level, and correction of the allowable number of exceedances associated with the NEPM standard of 50 $\mu g/m^3$ for the annual average of the 24 -hour average PM_{10} levels, which should be 5, not 6.

Recommendation 9

The Panel recommends that in view of the conservative assumptions used in the risk assessments and the very low levels of risk of adverse health impacts, additional monitoring of silica is unnecessary, would be a poor use of resources, and should not be required.

Recommendation 10

The Panel recommends that a noise monitoring program be prepared in consultation with EPA, and implemented. The noise monitoring program should:

- Give attention to measuring further background noise levels at the representative residential receivers adjacent to residences that have been predicted to exceed the best practice guideline levels;
- Be responsive to complaints;

- Use manned measurements.

Recommendation 11 The Panel recommends that the opportunity to reduce the major source of greenhouse gases from the mining – the pumping of water included in 'Other mine energy use' - be further investigated and practical action taken to increase the energy efficiency of the pumping.

Recommendation 12 The Panel recommends that:

- the broad outline of the Deed relating to future greenhouse gas emissions from the burning of coal from the proposed mining licence area provides a reasonable way forward in the short term, provided its detailed terms provide clarity about the savings to be achieved, and flexibility for the government to set entry parameters for HPS in any future ETS, and to vary those parameters in the light of experience;
- Government provide assurance that the PEM(GGEE) and its associated Action Plans will continue beyond 2006. The Deed should also provide, in the absence of any comprehensive ETS, that the requirements of the PEM(GGEE) and the associated IPRH Action Plans beyond 2006 are additional requirements to the greenhouse gas emissions savings specified;
- monitoring and reporting to improve the current fragmentation of greenhouse gas reporting, and to clearly report annually the amount of coal used, the average efficiency of generation, the amount of energy sent out, and the average emissions intensity achieved, should be required. To provide for better accountability such requirements should be included in the PEMP and IPRH's annual reports to the community.

Recommendation 13 The Panel recommends that;

- any planning permit for the construction of the Morwell River Diversion and the diversions of its tributaries and for the Strzelecki Highway deviation should contain conditions to ensure:
  - the agreed landscape amelioration works are implemented to the required standard;
  - the proper protocols are implemented according to Aboriginal Affairs Victoria procedures for known and potential Aboriginal heritage sites;
  - the proper protocols are implemented according to Heritage Victoria procedures for known and potential non-Aboriginal sites;
- the matters listed above should be referred to in the PEMP, and the mine work plan; and
- formal agreements with the Council and the CFA for the compensation or replacement of public facilities should be finalised, and the Work Authority under the MRD Act should require these agreements.

Recommendation 14 The Panel recommends that:

- IPRH continue with its investigations into:
  - the aquifer pressures and the degree of hydraulic connection between the Morwell and Traralgon aquifers and their respective influences on water level in the mine lake;

  - the issues associated with the potential for long-term batter instability after mining ceases;
  - trials to seek suitable species for the sustainable revegetation of the mine batters and the mine site in general, including both indigenous and non-indigenous species;
- DPI facilitates a cooperative arrangement between the mine operators in relation to the industry-wide problems of long-term batter instability after mining ceases;
- DPI facilitates a cooperative arrangement between the mine operators in relation to the revegetation trials, and that DSE provides its expert input to the trials.

Recommendation 15 The Panel recommends that:

- the Planning Environmental Management Plan be renamed the Project Environmental Management Plan (PEMP);
- the PEMP be updated by IPRH to include the various recommendations of the Panel, where supported by the Minister's Assessment;
- the PEMP be adopted and referenced in Planning Permit 04190, the EPA Works Approval and the mine extension Work Plan;
- the PEMP, which includes the CEMP and the OEMP, cover on-site and off-site monitoring and ameliorative works;
- the PEMP be recognised and understood by all parties to be subject to change as the detailed design is undertaken, and may be subject to further change through construction, commissioning of the diversion works, rehabilitation, Net Gain offset provision and mining;
- the PEMP be the only EMP for the project, so that there is only one authoritative document that requires updating, and only one authoritative and updated document that is referenced;
- the ERC review the PEMP periodically to ensure that it includes the outcomes of the approval process, the detailed design, and any further ameliorative measures that are required to address further problems that may arise. The ERC should be kept fully informed of the progressive detailed design outcomes, and the results of the monitoring program and any complaints about the construction and operation of the West Field works.

Recommendation 16 The Panel recommends that that subject to the various recommendations made throughout this Panel Report the proposal should be approved.

Recommendation 17 The Panel recommends that:

- providing a satisfactory negotiation on greenhouse gases is concluded, and consideration of the Minister's Assessment under the Environment Effects Act 1978 (which is anticipated to reflect generally the recommendations of the Panel that relate to the conditions for mining and ongoing management and monitoring are adopted in either the Mining Licence, the Work Plan or the PEMP as appropriate), the extended Mining Licence to be sought by IPRH be issued;
- a condition to the proposed Work Plan under both the existing and proposed Mining Licence as follows:

The proponent is to prepare and implement a native vegetation offset program, to the satisfaction of the Secretary of the Department of Sustainability and Environment, to achieve a 'net gain' biodiversity offset in accordance with the requirements of 'Victoria's Native Vegetation Management – A Framework for Action' and any associated guidelines, for the removal of native vegetation for the proposed works."

Recommendation 18 The Panel recommends that:

- the adoption of Amendment C32 and the granting of Permit Nos. 04189, 04190, 04191 and 04192, subject to any requirements flowing from the Minister's Assessment, following consideration of the Panel Report and the conclusion of the separate process in relation to greenhouse gas emissions from HPS. Minor amendment to the proposed condition on 04190 relating to Net Gain offsets are specified below, and earlier recommendations relating to the agreement for handing over the completed river diversion, other social issues and environmental management should be consolidated (see Recommendations on Stream Diversions, Section 11.2.5, on Other Social Issues, Section 19.5 and on Environmental Management, Section 21.2.2).
- additional conditions to Permit No 04190 to provide that:
  - the proponent is to prepare and implement a native vegetation offset program, to the satisfaction of the Secretary of the Department of Sustainability and Environment, to achieve a 'net gain' biodiversity offset in accordance with the requirements of 'Victoria's Native Vegetation Management – A Framework for Action' and any associated guidelines, for the removal of native vegetation for the proposed works;
  - the updated PEMP is to be referenced in the permit.

Recommendation 19 The Panel recommends that the EPA takes into consideration those detailed recommendations of the Panel in Chapters 11, 14, 15, 16, 17, 20 and 21 which are relevant to the Works Approval before it is finalised.

Recommendation 20 The Panel recommends that notice from the State to the Commonwealth Government relating to the requirements of Sections 130 and 133 of the EPBC Act can be satisfied through a combination of consideration of the Panel's conclusions and recommendations and the conclusion of the separate process on power station greenhouse gases, leading to the Minister's Assessment.

A. TERMS OF REFERENCE

"Note

To reduce the electronic size of this document the Appendices has not been included. Contact Planning Panels Victoria to obtain a copy of these pages."

B. DIRECTIONS

C. LIST OF WRITTEN SUBMISSIONS

C.1 INITIAL SUBMISSIONS

SUBMISSIONS TO THE ENVIRONMENT EFFECTS STATEMENT AND JOINTLY WRITTEN SUBMISSIONS

Sub No	Name	Organisation
1	James Haylock	
2	P Holt	
3	Dianne Giatzoglou	
4	Simon Klapish	
5	Nicola Solohub	
6	Kim Gehrig	
7	Pina McCafferty	
8	Judith Vary	
9	Annalisa Moon	
10	Richard Polmear	
11	A Walsh	
12	Mark Di Sisto	
13	Kyle Uytenbogoardt	
14	Daniel Colonnelli	Traralgon Insulations P/L
15	William Robinson	
16	Anthony Harwood	
17	Robert Tate	
18	Jason Van Der Velden	
19	Dr Ron Camier	
20	The Occupant	
21	Robert Drenen	
22	Richard Wood	
23	Stephen Dargan	
24	Laina Zajarski	
25	Keith Dixon	
26	Dean Suares	
27	Graeme Renwick	
28	Shane Mann	
29	Barry W Fitzgerald	Simon Engineering
30	Barney Hansford	
31	Les Dunn	
32	Lorraine Robinson	
33	Leo Sheldon	
34	L E Lon Ho Kee	
35	David Madden	
36	S Estrada	
37	Alan Estrada	
38	Bill Estrada	
39	Stephen Duncan	

40	Andrew O'Sullivan	
41	Paul Robinson	
42	Neville Robinson	
43	Ian Quail	
44	Ian Campbell	Cater Care Australia
45	Chris Morley	
46	Jeff Knowles	Andreco Hurll
47	The Occupant	
48	Murray Carrotte	
49	The Occupant	
50	Benjamin Falzon	
51	The Occupant	
52	Joe Dickason	
53	Peter Sheridan	
54	V Gates	
55	Peter Smith	
56	Geoff Murray	
57	Kerry Peachey	
58	Maree Zajac	
59	Ray Douglas	
60	W Paulin	
61	Frank Merante	
62	C J Fraser	Victorian Minerals & Energy Council
63	The Occupant	
64	Peter Junker	
65	Peter Brimblecombe	
66	Leanne Honeychurch	
67	Paul Bur	
68	Tracey Burr	
69	Cheryl Blowers	
70	Brian Pirotta	
71	James McCue	
72	P Greenhill	
73	Dr M A Tuck	University of Ballarat
74	Barry J Anderson	
75	Don Mintern	
76	Fred Baldacchino	
77	Kevin Foster	
78	Jason Quail	
79	Peter Viggiano	
80	Donna Huizer	
81	Noel Asmussen	
82	Chris Shepherd	
83	Joe Debnam	
84	Neville Hyde	
85	W M Thomas	William Adams Pty Ltd
86	Peter McLachlan	

87	Peter Shaw	
88	John Cunico	
89	Shawn Byrne	
90	Paul Melbourne	
91	Raymond Melbourne	
92	R Kingwill	
93	Shane Chapman	
94	Lincoln Herbert	
95	Robert Matthes	
96	John Duncan	
97	W Stephens	
98	Michael Mayze	
99	Ricky Porter	
100	P Alexander	
101	Hans Kuempflein	
102	The Occupant	
103	Andrew Phillips	
104	John Dunne	
105	Rob Gardner	
106	Kaine Roylance	
107	The Occupant	
108	William Gorwell	
109	Patrick Walsh	
110	Michael Gardiner	
111	The Occupant	
112	The Occupant	
113	Michael Matthews	
114	Rodney Meredith	
115	Phil Nancarrow	
116	Morris Giles	
117	Laurie Howett	
118	The Occupant	
119	Ian Mitchell	
120	Details illegible	
121	R Higginson	
122	Steven Howard	
123	Jason Haeusler	
124	Steven Armstrong	
125	J Faithfull	
126	Wayne Draper	
127	Jaime Higginson	
128	Len Fullerton	
129	Norm Eacott	
130	Peter Briggs	
131	The Occupant	
132	Peter DeVert	
133	Laurence Farrugia	

134	Greg Cann	
135	Jacqui Leek	
136	Trevor Pohocke	
137	Desmond Ruka	
138	David Shanahan	
139	W Winderlich	
140	Anthony Richards	
141	U Taysom	
142	Alan Ryan	
143	Matthew Weddell	
144	Wayne Gray	
145	The Occupant	
146	David Tangi	
147	The Occupant	
148	The Occupant	
149	Stephen Fox	
150	Travis Smith	
151	Newman ?????	
152	Daryl Coleman	
153	The Occupant	
154	Darren Moon	
155	James Baker	
156	Peter Nichol	
157	Pat Micah	
158	Joshua Cleland	
159	Kevin Kelly	
160	Jim Henry	
161	Glen Cook	
162	The Occupant	
163	Karla O'Bryan	
164	Quinton Leed	
165	The Occupant	
166	Debbie Hill	
167	Ray Linton	
168	Renato Anthony Innocenzi	
169	Nicole Smith	
170	Gail Smith	
171	Ray Beebe	
172	Patrick Sleswick	Transpacific Industrial Solutions Pty Ltd
173	Stephen Hegarty	Transpacific Industrial Solutions Pty Ltd
174	Ross Bertoli	Hydro Australia P/L
175	G Cake	
176	The Occupant	
177	The Occupant	
178	Michael Jonken	
179	R S Love	
180	John Maggan	

181	David Camilleri	
182	William Meall	
183	Geoffrey Gatt	
184	Grub Melnyk	
185	Rob Majstorovic	
186	Charlie Baldacchino	
187	Grant Vickery	
188	Bob Allen	
189	Alistair Tompkin	
190	T Schoonderberg	
191	Paul E Harris	Eastwood Harris P/L
192	Narelle Wilkins	
193	Ian Place	
194	Ruth Place	
195	Len Albanese	
196	Brett Cornish	
197	Jane Cornish	
198	Brad Marriott	
199	James Armistead	
200	Daniel Bianconi	
201	Cheryl Tompkin	
202	P B McManus	
203	Shane McCreesh	Belle Banne Vic P/L
204	The Occupant	
205	Kae-leene White	
206	Simon Van Baalen	
207	C W Sylvester	Latrobe Management Ltd
208	Chris Forsterling	
209	Craig Clark	
210	Simon Trebilcock	
211	Christine Sheldon	
212	Brian Phillips	MPI Mines
213	John Hehir	Childrens Traffic School
214	Brigitta Zaffina	
215	Lorna Long	
216	Jack Huxtable	
217	George Phair	
218	Daniel Bootman	
219	Greg Gregoriou	
220	Duncan Orr	
221	Terry McDonald	
222	Robert Dugan	
223	Robert Mansell	
224	Romeo Prezigo	
225	Mark Warr	
226	Dennis Dickason	
227	Wayne Porter	

228	Barbara Kozlowski	
229	Jeff Gunningham	
230	Deanna Mann	
231	Keith Brownbill	Advance Morwell Inc
232	Peter Ryan	Crinigan Bushland Reserve
233	Valerie Prokpiv	
234	Stephen Groen	
235	David Birney	
236	Neil Cartwright	
237	A J F Tompkin	
238	Ricky Howard	
239	Laurie Jackson	
240	Nicole Mills	
241	Anthony Dunn	
242	Robert John Till	
243	Jon Sestokas	
244	Michael Andrijczak	
245	Allan Blood	Australian Power & Energy Ltd
246	Ron Bennett	
247	Chris Stockdale	
248	Mark Moerke	
249	Andrew Foulkes	
250	Geoff Horne	
251	Simon Orton	
252	Marlene Orton	
253	Adelaide Knight	
254	Keith Knight	
255	Tony Briffa	
256	John Beckham	
257	Debbie Shaw	
258	Peter Webb	
259	M Smith	
260	Maree Wolfenden	
261	Colin Brick	
262	David Froud	
263	David Arnault	
264	D T Andrew	Tarnagulla Resources Ltd
265	Rob Whelan	Churchill District Community Association
266	Peter Brown	Yallourn Golf Club
267	T D Lawless	
268	Jane Baldacchino	
269	Wally Anders	
270	Christine McMaster	
271	Tony Concannon	
272	Renata Kozlowski	
273	Noel Ashford	
274	Kevin Kelly	

275	Anna Kozlowski	
276	Larry Naismith	Latrobe City
277	Kevin Beer	
278	Alan Moran	Institute of Public Affairs
279	Michael Rizzo	Australian Services Union
280	Ian Willcox	
281	Tony Edgar	DSE
282	Neil Lawson	
283	Arie Kliger	Diamond Protection
284	David Sheehan	SGS Environmental Services
285	David Addis	
286	Gavin Hillenaar	
287	Karen Hillenaar	
288	Irene Mansell	
289	Doug Anton	
290	K Clissold	
291	Graeme Vaux	
292	Brian Hicks	
293	Sidney Cook	
294	Alex Cooper	
295	M Rice	
296	Mark Fornham	
297	Scott Roberts	
298	Ross Noske	
299	The Occupant	
300	Daryl Ross	
301	John Tysurski	
302	Terry Best	
303	Steve Godwin	
304	Alicia Huizer	
305	Adrian Huizer	
306	Phillipa Varris	
307	The Occupant	
308	Gordon Rintoul	
309	Peter McHenry	
310	Jenny Rutherford	
311	Ross Maxfield	
312	Steve Sanders	
313	Brian Mawley	
314	Colin Mactaggart	
315	Lyell Brewer	
316	Andrew Ward	
317	Michael Grech	
318	Frank Keighran	
319	Stephen Evans	
320	Anthony Cutajar	
321	Greg Dunn	

322	Nick Calabrese	
323	George Stipkovich	
324	Noel Thompson	
325	Rohan Jewell	
326	Robert Bachelti	
327	John Turner	
328	Darrell Smith	
329	S Heard	
330	Tony Knowles	
331	C Rendall	
332	Bruce Fisher	
333	Graeme Jackson	West Gippsland Catchment Management Authority
334	Ron Witton	
335	Hilko Dusseljee	Bendigo Mining NL
336	Harvey Dinelli	VicRoads
337	H Thompson	
338	Gary Vandersteen	
339	Garry Carstein	
340	Rino Marino	
341	Chris Buckingham	
342	Russell Camier	
343	Hon Peter Hall, MLC	
344	Don Johnson	Roche Thiess Linfox Joint Venture
345	Jan Donnett	
346	Peter Donnett	
347	Jeffrey Bathgate	
348	Andrea Dickason	
349	Grace Dickason	
350	Matthew Dickason	
351	Melinda Bathgate	
352	Sarah Dickason	
353	Kim Goldsbrough	
354	K Fraser	
355	Darren Grieve	
356	Jacqui Grieve	
357	Jess Macri	
358	Dallas Ravelje	
359	Davin Thompson	
360	Peter Kelly	
361	Ian Newnham	WBM Pty Ltd
362	Lucia Reynolds	
363	Lucia Reynolds	Latrobe Valley Mixed Darts League
364	Heinz Zajac	Zajac Excavation
365	Elsie McMaster	Morwell Historical Society Inc
366	Alison Bruce	
367	Anthony L'Hotellier	
368	Patricia Dargan	

369	Alison Darling	
370	Richard Johnston	Furmanite Australia P/L
371	Michael Vella	
372	Andrew Riess	
373	Rob Sharrock	
374	Keith Brownbill	
375	Sophy Morley	
376	Maree McPherson	Gippsland Area Consultative Committee
377	Gregory Clarke	
378	Paul Briffa	
379	J F O'Connor	
380	Greg Hardy	
381	Nick Demetrios	
382	Sam Mickeown	
383	Charlie Nickelson	
384	Carmelo Rachoele	
385	James Johnston	
386	Rohan Murray	
387	Tony Hadjistefanis	
388	Andrew Johnston	
389	A Hiscoca	
390	The Occupant	
391	Ian Chitty	
392	Peter Stirrett	
393	Neil Bates	
394	Alan Bullen	
395	Barry Cumming	
396	Janine McConan	
397	Richard Griffith	
398	The Occupant	
399	Rob Benson	
400	J Sammut	
401	The Occupant	
402	F Ditterich	
403	Nigel Browne	
404	R Tomasetti	
405	E Nachorny	
406	David Young	
407	John Visser	
408	Stuart Hill	
409	Mark Glanbitz	
410	The Occupant	
411	Richard Brymner	
412	Rod Huffer	
413	R J Seabrook	
414	Bill Jacobs	
415	Ricky Nathan	

416	Samantha Schulz	
417	Malcolm Reid	
418	B Roberts	
419	Neil Hecker	
420	Bruno Saulle	
421	George Rappold	
422	Chris Watson	
423	The Occupant	
424	Ted Vervoort	
425	The Occupant	
426	The Occupant	
427	T Corrison	
428	The Occupant	
429	G N Tatterson	
430	Peter Lawrence	
431	Stephen Orr	
432	Danny McKeown	
433	Nicole McKeown	
434	Ron Boskma	
435	Kathleen McKeown	
436	Gary Rhodes	
437	Gary Fraser	
438	Joanne Merante	
439	Susan Fraser	
440	Joy Beckman	
441	D Beckman	
442	Stephen Pancutt	
443	The Occupant	
444	Tracey Azlin	
445	Shawn Azlin	
446	Pam Murphy	
447	J Santoro	
448	Tony Vuillermin	
449	The Occupant	
450	Terry Nelson	
451	Michael Cardona	Transport Spares & Repairs P/L
452	John Atkins	Applied Pump Engineering P/L
453	Adam Creighton	Protector Autoglass
454	Jason Euman	C G E Hire P/L
455	Adam Elphinstone	
456	William A Morris	
457	Amanda Miles	
458	Owen Kees	Bell Equipment Australia
459		Komatsu Australia Ltd
460	Michael Bourchier	Hitachi Construction Machinery (Aust)
461	Robert Bevis	Bridgestone Earthmover Tyres
462	Peter Selcombe	

463	Mio Savic	Roylance
464	B Gross	Alpha Rigging Service
465	Clarrey Debnam	Debnams Transport
466	Peter Richards	Strut Regas
467	Ron Patterson	Morwell Valves & Fittings
468	John Mitchell	Gippsland Water
469	John O'Brian	J O B Electrical
470	Jeff Sherritt	Tilt Tray
471	Neil Watt	M G Filter Service
472	John Tomkins	Johns Signs
473	David Mason	Boltco
474	Russell Keenan	Wurth
475	Steve Micha	Moe Timber Supplies
476	Pam Mason	Ausworkwear & Safety
477	Warren Frost	Blackwoods
478	Paul Foster	Gippsland Automotive
479	Nerissa Albon	Grey St Primary School
480	Bill Watson	Alexanders Brake & Clutch
481	Ross Turnbull	Latrobe Valley Machining
482	Ron Didjurgies	Mid Valley Bearings
483	Bill O'Halloran	Gippsland Bolts & Fastners
484	Tony Mann	Tyre Power
485	David Robinson	Hydraulic & Pneumatic
486	Peter Bourke	Valley Hydraulics
487	Ernie Meursing	Auto Smart
488	Eddie Zelic	Procus Welding
489	James Heland	C E G Hire Pty Ltd
490	Brett Roberts	Morwell Springs
491	Robert Danielsen	Victoria Lube
492	Russell Bennett	Bursons
493	Tony Mifsud	Romlik Sheetmetal
494	Trevor Kit	Melbourne International Truck Centre
495	Chris Barfoot	
496	Stan Kemsley	
497	Peter McGauran, MP	
498	Kathryn Ritzer	PowerWorks
499	Pauline Howell	Latrobe Civil Constructions P/L
500	Mark Pettigrew	
501	Tony Lee	
502	Tony Lopress	
503	Sharlene Sexton	
504	The Occupant	
505	Steven Shaw	
506	Andrew Redston	Quantum Support Services
507	Elaine Andrijczak	
508	Ken Heywood	
509	Luke van der Meulen	

510	Ron Smooker	Clayton Utz
511	Lisa Kitson	
512	Bruce McDonald	
513	Nicholas Smart	GTL Energy Ltd
514	Neil Dow	GWA International Ltd
515	Barnaby McIlrath	Environment Defenders Office
516	Prof Don Nicklin	Exergen P/L
517	Elizabeth Steeper	National Council of Women of Victoria
518	Ian Nethercote	LoyYang Power
519	Stan Wright	
520	S K Brown	
521	Michael Darling	
522	Brendan Darling	
523L	Peter Beilby	Iluka Resources Ltd
524L	Les Hunt	EEA Group P/L
525L	Scott Dernam	
526L	Steve McDermott	
527L	Dale Seymour	Department of Primary Industries
527L	Guy Hamilton	Department of Primary Industries
528L	Gary Mauger	
529L		Hazelwood Cemetery Trust
530L	Rod Atkinson	
531L	Gordon MacKintosh	Morwell Festival of Dance
532L	Michelle Soutar	
533L	David Guy	EPA
534L	Keith Orchison	Coolibah Pty Ltd
535L	Julie Eichner	Australian Institute of Management - Gippsland
536L	Richard Nedov	ALSTOM Power Limited
537L	Julie Eichner	Department of Human Services
538L	Steve Dodd	Gippsland Trades & Labour Council
539L	Anita Stratton	Gippsland Go-Kart Club Inc
540L	Brent ???	
541L	S Lalor	
542L	Andrew Biram	
543L	R Brand	
544L	Herman Celima	
545L	Bernard Coleman	
546L	M Coney	
547L	Jamie Cooke	
548L	Ian Daye	
549L	D Dellazzer	
550L	Paul J Drewen	
551L	Danny Kearns	
552L	Stephen Knight	
553L	G Lalor	
554L	Glenn Macdonald	
555L	Scott McCafferty	

556L	Wayne McGill	
557L	Brett Page	
558L	Michael Pyke	
559L	Stuart Reeves	
560L	Darren Richardson	
561L	Jason Seats	
562L	Mark Trippit	
563L	Trevor Vuulerman	
564L	Kurt Weiss	
565L	Dr Peter Jackson	CRC
566L	Brendan Jenkins, MP	

SUBMISSIONS TO AMENDMENT C32 TO THE LA TROBE PLANNING SCHEME SENT DIRECTLY TO THE CITY OF LA TROBE

Sub No	Name	Organisation
P.A. 1	G Saunders	Origin Energy Asset Mgt P/L
P.A. 2	Jenny Davidson	Gippsland Water
P.A. 3	Christian Knight	CFA
P.A. 4	Graeme Jackson	West Gippsland Catchment Mgt Authority
P.A 5	Phil Burn	Dept of Primary Industries

C.2 SUBMISSIONS FOLLOWING RE-NOTIFICATION AND RE-ADVERTISEMENT IN RELATION TO GREENHOUSE GAS EMISSIONS FROM THE HAZELWOOD POWER STATION

Sub No	Name	Organisation
1	Richard Bolt	Department of Infrastructure
2	Barnaby McIlrath	Environment Defenders Office
3	George L Phair	
4	Dr Patricia Phair	
5	Sallyanne Everett C/- Clayton Utz	HRL Ltd & HRL Development Pty Ltd
6	David Lea	APEL
7	Richard Nedov	Alstrom Power Ltd
8	Dean Wickenton	Australian Industry Group
9	John Marsiglio	EPA Victoria
10	George L Phair	
11	Martin Albrecht	Exergen Pty Ltd
12	Neil Coulson	VECCI
13	Paul Buckley	Latrobe City Council
14	John Harrison	GTL Energy Ltd
15	Malcolm McIntosh	CRC for Clean Power from Lignite
16	Chris Fraser	Minerals Council of Australia
17	Brad Page	Energy Supply Association of Australia Limited
18	Charles Berger	Australian Conservation Foundation
19	Dr Keith Orchison	Coolibah Pty Ltd
20	Dr Pat Phair	National Council of Women Victoria

D. LIST OF HEARING EXHIBITS

D.1 INITIAL HEARINGS

Exhibit No	Description	Tabled*
Australian Power and Energy Limited (APEL)		
APEL#1	Presentation by David Lea, David Lea Consulting on behalf of Australian Power and Energy Limited – "Transition to a Low Emissions Brown Coal Future".	Day 8
Department of Primary Industries (DPI)		
DPI#1	Presentation by Guy Hamilton, DPI on International Power – Hazelwood West Field EES Fact Sheet 1 Brown Coal Tender: An Overview. Fact Sheet 3 How the Tender Process will Work.	Day 5
DPI#2	Response on Issues (a), (c) and (e) in the Panel's Directions	Day 5
DPI#3	Schedule 13 (Regulation 25) to Mineral Resources Development Regulations 2002: 'Information required in Work Plan for a Mining Licence'.	Day 7
DPI#4	DPI response to questions from the Panel relating to: • Information provided to tenderers for Brown Coal Tender. • How the rehabilitation bond was calculated for the Latrobe Valley generation companies. • The use of administrative law provisions for the settlement of disputes • Copy of Schedule 13 (provided as DPI#3).	Day 7
DPI#5	Schedule 18 (Prescribed Licence Document) to Exploration Licence 4685 to HRL Developments Pty Ltd issued under Mineral Resources Development Act 1990.	Day 10
DPI#6	DPI response to supplementary questions from the Panel (Q390 regarding draft mining licence conditions. Email from Guy Hamilton dated 25 August 2004	Day 11
DPI#7	Email dated 14 September 2004 from Guy Hamilton, DPI providing information on Pacific Edge Holdings brown coal drying technology. Extract of article from CSIRO Process Magazine – June 2004	Subsequent to Hearing
Department of Sustainability and Environment (DSE)		
DSE#1	Presentation by Geoff Ralphs, DSE - "DSE Planning Systems & Policy Overview of Assessment (EES) Process".	Day 1
DSE#2	Presentation by Peter McHugh, DSE on International Power Hazelwood West Field Project.	Day 5
DSE#3	Addendum to DSE Submission and covering letter from DSE dated 11 August 2004.	Day 10

Environmental Defenders Office (VIC) Ltd (EDO)		
EDO#1	Submission to Panel on behalf of Environment Victoria, the Australian Conservation Foundation, World Wildlife Fund for Nature Australia and Climate Action Network Australia, Directions Hearing 12 July 2004 'Consideration of Greenhouse Impacts'.	Dir Hrg
EDO#2	Appendix A of EDO#1: Extract from Victorian Greenhouse Strategy: Part B – Greenhouse Response Actions (downloaded document from Victorian Government website).	Dir Hrg
EDO#3	Appendix B of EDO#1: Extract from document "Using Victoria's Planning System" (pages 26-31) Sections 2.4.10 Panel Hearings, 2.4.11 What issues does a panel need to consider? and 2.4.12 Considering the panel's report on submissions.	Dir Hrg
EDO#4	Appendix B1 of EDO#1: Environment Protection Act 1970 – Sect 26D (downloaded document from Victorian Government legislation website).	Dir Hrg
EDO#5	Appendix B2 of EDO#1: Flora and Fauna Guarantee – Scientific Advisory Committee, Final Recommendation on a nomination for Listing, Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases (File No FF/54/0003 with respect to Nomination No 472).	Dir Hrg
EDO#6	Federal Court of Australia: Summary of proceedings of case "Humane Society International Inc vs Minister for the Environment and Heritage [2003] FCA 64 (12 February 2003) in relation to Grey-headed Flying-fox	Dir Hrg
EDO#7	Guidelines for Preparing Environmental Effects Statements for Mining Projects	Dir Hrg
EDO#8	Appendix C of EDO#1: Letter from Australian Government Department of the Environment and Heritage to Barnaby McIlrath, Environmental Defenders Office (VIC) Ltd dated 1 July 2004 regarding request for reconsideration of IPRH's EPBC Referral on grounds on 'substantial new information'	Dir Hrg
EDO#9	Victoria's Clean Energy Future Replacing Hazelwood Power Station Discussion Document by Dr Mark Diesendorf.	Day 6
EDO#10	Submission to Panel Inquiry Environment Effects Act 1978 and Planning & Environment Act 1987 Hazelwood West Field Phase 2 Proposal Powerworks Morwell 4 August 2004: 'Positioning Victoria to Prosper in a Carbon Constrained Economy'.	Day 6
EDO#11	Copies of correspondence (letter dated 11 August 2004 from Minister for Planning to Environmental Defenders Office (EDO) and letter dated 24 August 2004 from EDO to the Panel Chair).	Day 11
EDO#12	Copy of Application under Section 39 of the Planning and Environment Act 1987 lodged by Environmental Defenders Office with the Victorian Civil and Administrative Tribunal (dated 20 August 2004).	Day 11

Environment Protection Authority Victoria (EPA)		
EPA#1	Presentation to EES Panel Hearing by John Marsiglio, EPA.	Day 7
EPA#2	Table 1: Latrobe Valley Air Monitoring Network Stations, 2003 and Figure 1: Latrobe Valley Air Monitoring Network, 2003.	Day 7
EPA#3	Email from John Marsiglio 23 August 2004 re Greenhouse processes	Day 11
HRL Limited and HRL Developments Pty Ltd (HRL)		
HRL#1	Submission on behalf of HRL Limited and HRL Developments Pty Ltd for the purposes of the Directions Hearing on Monday 12 July 2004 by Clayton Utz.	Dir Hrg
HRL#2	Copy of published agenda for the Ordinary Council Meeting of Latrobe City Council held Monday 5 July 2004 regarding Item 10.2.2 Amendment C32 to the La Trobe Planning Scheme.	Dir Hrg
HRL#3	Extract of IPRH West Field Project EES (Section 2.2.3 Planning Scheme Amendment and Planning Permits p2-4 of EES Volume 1).	Dir Hrg
HRL#4	Extract of Water Act 1989 (Sections 50, 51, 65, 66, 67, 67A, 67B & 68)	Dir Hrg
HRL#5	Copy of correspondence from HRL Limited and HRL Developments Pty Ltd to Minister for Planning dated 8 July 2004 regarding exclusion of greenhouse gas emissions from assessment guidelines for West Field Project	Dir Hrg
HRL#6	Expert Witness Statement by Terry Johnson, HRL Developments Pty Ltd on IDGCC Technology.	Day 1
HRL#7	Expert Witness Statement by Dr R Gaulton and K Dugan, BFP Consultants Pty Ltd on Fifth Morwell River Diversion Geotechnical Design Factors.	Day 1
HRL#8	Expert Witness Statement by E Waghorne and G Reinsch, GHD on Implications of Driffield Mining Options due to the Proposed Relocation of Morwell River.	Day 1
HRL#9	Expert Witness Statement by Lewis Sayer, WSC Planning Pt Ltd on Amendment C32 to La Trobe Planning Scheme	Day 7
HRL#10	Opening submissions on behalf of HRL Limited and HRL Developments Pty Ltd by Ian Lonie, Clayton Utz	Day 9
HRL#11	The Australian Financial Review Tuesday 10 August 2004 Article “Australia’s renewable energy debate runs out of puff”.	Day 9
HRL#12	Presentation by E Waghorne and G Reinsch on Implications on Driffield Mining Options due to the Proposed Relocation of Morwell River	Day 9
HRL#13	Presentation by Dr R Gaulton and K Dugan, BFP Consultants Pty Ltd on Fifth Morwell River Diversion Geotechnical Design Factors (tabled but not presented).	Day 9
HRL#14	Presentation by Lewis Sayer, WSC Planning Pty Ltd on Amendment C32 to La Trobe Planning Scheme (tabled but not presented).	Day 9

HRL#15	Presentation to Hazelwood West Field EES Panel by Terry Johnson on HRL Developments IDGCC Technology.	Day 10
HRL#16	Annotated figure showing quantities of coal quarantined in HRL exploration licence area by proposed Fifth Morwell River Diversion entitled "Revision – 13 August 2004 – Split of different areas between Cases 1, 2 and 3."	Day 10
HRL#17	HRL: Amendment C32 to La Trobe Planning Scheme. Notes on further information requested by the Panel at hearing on 11 August 2004 and follow up actions. Tabled by Clayton Utz.	Day 10
HRL#18	Closing submissions on behalf of HRL Limited and HRL Developments Pty Ltd by Ian Lonie, Clayton Utz.	Day 10
HRL#19	HRL: Amendment C32 to La Trobe Planning Scheme. Further information arising out of hearing on 13 August 2004. Tabled by Clayton Utz.	Day 11
HRL#20	Copy of correspondence from Lewis Sayer to Mr Ian Lonie and Ms Sallyanne Everett, Clayton Utz dated 26 August 2004 regarding IPRH West Field Project Morwell Amendment C32 to La Trobe Planning Scheme and EES, and Planning Applications Response to further submissions by Latrobe City Council, Matrix Planning and IPRH.	Day 11
International Power Hazelwood (IPRH)		
IPRH#1	Opening address by Barton Napier, Enesar on behalf of IPRH (Powerpoint presentation).	Day 1
IPRH#2	Presentation by David Quinn, CEO, IPRH on International Power Australia and IPRH.	Day 1
IPRH#3	List of IPRH employee numbers since purchase of business in 1996	Day 1
IPRH#4	Presentation by Barton Napier, Enesar on behalf of IPRH on West Field Project - Project Description.	Day 1
IPR#5	Travel time figures (Figures 1-4) from presentation tabled as IPRH#3.	Day 1
IPRH#6	Precipitator performance information.	Day 1
IPRH#7	Presentation of Strategic Assessment Guidelines prepared by Andrew Clark, Matrix Planning.	Day 1
IPRH#8	Planning Environmental Management Plan, July 2004, CR 1011_16_v1.	Day 1
IPRH#8A	IPRH response to Direction 2(f) made at the Directions Hearing held on 12 July 2004 (covering note to Planning Environmental Management Plan referred to as exhibit IPRH#8).	Day 1
IPRH#9	Presentation by Ross Hardie, Earth Tech on Phase 2 of the West Field Development of the Hazelwood Mine Functional Design of Morwell River and Tributary Diversions and Residual Riverine Impacts July 2004.	Day 2
IPRH#10	Statement of Evidence by Ross Hardie, Earth Tech	Day 2
IPRH#11	Presentation by Robert Keller, RJ Keller & Associates on peer review process for functional design of stream diversions.	Day 2

IPRH#12	Expert Witness Statement of Dr Robert Keller.	Day 2
IPRH#13	West Field Project Statement of Evidence Noise Impact Assessment by Gustaf Reutersward, Richard Heggie Associates (RHA).	Day 2
IPRH#14	Presentation by Gustaf Reutersward, RHA on West Field Project Noise Impact Assessment.	Day 2
IPRH#14A	The Australian Financial Review Tuesday 27 August 2004 Article "Energy users face higher prices".	Day 2
IPRH#15	Statement of Evidence to Independent Panel Hearing Air Quality Impact Assessment Study by Graeme Ross, CAMM.	Day 3
IPRH#16	Presentation by Graeme Ross, CAMM on Air Quality Impact Assessment Study.	Day 3
IPRH#17	"Comments regarding EPA Submission on the risk assessment undertaken for airborne silica in relation to the International Power Hazelwood Mine extension" by Dr Roger Drew, Toxikos Pty Ltd.	Day 3
IPRH#18	Statement of Evidence by Stephen Mueck, Biosis Research on International Power Hazelwood West Field Project: Flora and Fauna.	Day 3
IPRH#19	Presentation by Stephen Mueck, Biosis Research on Flora and Vertebrate Fauna Assessment Study.	Day 3
IPRH#20	West Field Development Costs (breakdown of development costs by IPRH).	Day 3
IPRH#21	Victoria's Native Vegetation Management – A Framework for Action, DNRE, 2002.	Day 3
IPRH#22	Presentation by Richard Polmear, IPRH on HRL interface	Day 4
IPRH#23	Proposed Driffield Project Environment Effects Statement – pages 6-26 and 6-30 and figures 6.9 and 6.10.	Day 4
IPRH#24	Presentation by Richard Polmear, IPRH on mine closure.	Day 4
IPRH#25	Extract from EPA Works Approval Application for Ash Containment.	Day 4
IPRH#26	Response to Comments by Dr Mark Diesendorf on the MMA Report dated 3 August 2004 by Ross Gawler, MMA.	Day 6
IPRH#27	Expert Witness Statement by Anthony Lane, Lane Consulting Pty Ltd on Groundwater & Ramsar Wetlands Hazelwood West Field EES.	Day 6
IPRH#28	IPRH: Ash Composition – Precipitator Dry Ash and Ash Pond Samples (Leached Ash).	Day 7
IPRH#29	Copy of letter from David Quinn, CEO, IPRH to Mr George Phair dated 22 July 2004 and copy of response by Mr George Phair (letter dated 26 July 2004.	Day 7
IPRH#30A	Presentation by Don Johnson, RTL entitled Morwell River Diversion – EES Panel Submission.	Day 8
IPRH#30B	Morwell River Diversion – EES Panel Submission Notes prepared by RTL and dated 6 August 2004.	Day 7

IPRH#31	Notes for discussion with Hazelwood West Field panel inquiry 6 August 2004 prepared and spoken to by Keith Orchison AM, Director, Coolibah Pty Ltd.	Day 7
IPRH#32	Presentation by Carmel Coyne, Enesar entitled "Public Hearing – Planning EMP".	Day 7
IPRH#33	Article by Alan Moran posted Monday 2 August 2004 on On Line Opinion website and entitled "What we have achieved and where the parties will lead us with energy policy".	Day 7
IPRH#34	Figure 3 from notification to Minister for Planning on need for EES for West Field Project.	Day 9
IPRH#35	Figure 1 Driffield Development prepared by GHD for HRL Developments Pty Ltd and supplied to IPRH by HRL.	Day 9
IPRH#36	HRL and IPRH Interface: Review of meeting dates and content. Chronology of communications between parties supported by annexures.	Day 9
IPRH#37(a)	Figure 1 HRL Interface prepared by IPRH in response to request from the Panel for map of stripping ratios presented in HRL's submission to West Field EES (Submission No 510).	Day 9
IPRH#37(b)	Figure 1 Mineral Resources Development Act Existing and Proposed Tenements prepared by IPRH in response to request from the Panel for a map showing relationship of mining and exploration leases.	Day 9
IPRH#38	Extract of Proposed Driffield Project EES (pages 6-26 and 6-30 and Figures 6.9 and 6.10). Figure 1 to Major Morwell River Diversion Proposals (Fryer, 2003).	Day 9
IPRH#39	Presentation by Richard Polmear, IPRH on Sixth MRD A possible Win – Win – Win.	Day 9
IPRH#40	Figure 1(a) HRL Interface showing MRD6d prepared by IPRH in support of presentation provided as IPRH#39.	Day 9
IPRH#41	Letter from Ross Hardie, Earth Tech to Carmel Coyne, Enesar dated 10 August 2004 regarding pre-feasibility assessment of flood impacts and geomorphic performance of MRD6d.	Day 9
IPRH#42	Correspondence (email dated 13 August 2004) and presentation on comparison of IGCC and AIDG technologies by Wibberley, Palfreyman and Nunn, CCSD.	Day 9
IPRH#43	Extract from NEMMCO Statement of Opportunities 2003 (pages 2-18 and 2-19) in relation to availability of non-scheduled embedded generation (e.g., wind power) at the time of maximum demand.	Day 10
IPRH#44	Executive Summary NEMMCO Statement of Opportunities 2003.	Day 10
IPRH#45	Executive Summary NEMMCO Statement of Opportunities 2004.	Day 10
IPRH#46	Paper by David Quinn, CEO, IPRH to 15th Annual National Power Conference – "Investing in New Generation Capacity".	Day 10

IPRH#47	IPRH Response to HRL Planning Submission by Mallesons Stephen Jaques.	Day 10
IPRH#48	Revised Strategic Assessment Guidelines prepared by Andrew Clark, Matrix Planning.	Day 10
IPRH#49	IPRH Closing Submission prepared by Enesar on behalf of IPRH.	Day 10
IPRH#50	Closing submission by Barton Napier, Enesar and David Quinn, CEO, IPRH (Powerpoint presentation).	Day 10
No reference	Folder of responses to Chair's Written questions 1 – 80.	Day 10
No reference	Folder of responses to questions raised by the Panel during the Hearings	Day 10
IPRH#51	IPRH response to further questions from the Panel for hearing on 27 August 2004.	Day 11
IPRH#52	Amendment C32 and Planning Permit Applications 04189, 04190, 04191, 04192	Day 11
Latrobe City Council (LCC)		
LCC#1	State Planning Policy Framework & La Trobe Planning Scheme MSS	Day 1
LCC#2	Submission on behalf of Latrobe City dated 30 July 2004.	Day 5
LCC#3	Latrobe City Council response to Panel inquiry "Being further information to the Panel EES for International Power Hazelwood West Field Project" on the compliance of the planning permit applications with MAV/DOI publication "Writing Planning Permits".	Day 8
LCC#4	Writing Planning Permits (DSE/MAV, 2003).	Day 8
LCC#5	Letter from Paul Buckley, CEO, Latrobe City to David Quinn, CEO, IPRH dated 13 August 2004 regarding IPRH response to HRL submissions on Amendment C32 to La Trobe Planning Scheme.	Day 10
LCC#6	Victorian Government Gazette 13 May 2004 pages 1222-1224 La Trobe Planning Scheme Notice of Preparation of an Amendment to Planning Scheme and Notice of Applications for Planning Permits Amendment C32 Applications 04189, 04190, 04191 and 04192.	Day 11
Miscellaneous Exhibits		
S#1	Statement by Stan Brown in support of his presentation to Panel.	Day 8
S#2	Submission and notes presented by Julie Tyrrell, Trustee and John Parker, Secretary, Gippsland Trades & Labour Council.	Day 8
S#3	Notes to support presentation by Chris Fraser, Executive Director, Minerals Council of Australia, Victorian Division.	Day 8
S#3(a)	Coal21 A Plan of Action for Australia March 2004, a paper on Reducing Greenhouse Gas Emissions Arising from the Use of Coal in Electricity Generation. Tabled by Chris Fraser, MCA.	Day 8
S#4	"Supplementary comments to note submitted on 14th June". Notes to support presentation by George Phair.	Day 8
S#5	"Planned expansion of the Hazelwood Power Station in the Latrobe Valley, August 2004". Notes to support presentation by Dr Pat Phair.	Day 8

S#6	"West Field Project Submission by Childrens Traffic School". Notes to support presentation by John Hehir, Committee Member.	Day 8
VicRoads		
VicRoads#1	Presentation by David Gellion, Paul Taylor and Joe Bechaz, VicRoads on road network options and Overdimensional Route 9.	Day 6
VicRoads#2	Copy of Class 1 Permit for transport of overdimensional load (generator stator) from Webb Dock to Loy Yang	Day 6
West Gippsland Catchment Management Authority (WGCMA)		
WG#1	Letter from Geoff Hocking, CEO, WGCMA to Robin Saunders, Chairman, West Field Project EES Panel dated 4 August 2004 regarding proposed Morwell River diversion.	Day 5

* Note: The entries in Column 3 refer to the following days of the Panel Hearings:

Dir Hrg	Directions Hearing Monday 12 July 2004	Day 6	Wednesday 4 August 2004
Day 1	Monday 26 July 2004	Day 7	Friday 6 August 2004
Day 2	Tuesday 27 July 2004	Day 8	Monday 9 August 2004
Day 3	Wednesday 28 July 2004	Day 9	Wednesday 11August 2004
Day 4	Thursday 29 July 2004	Day 10	Friday 13 August 2004
Day 5	Friday 30 July 2004	Day 11	Friday 27 August 2004

D.2 RE-CONVENED HEARINGS

Exhibit No	Description	Tabled*
Australian Conservation Foundation (ACF)		
ACF#1	Supplementary comments of the ACF on fugitive coal mine emissions	Day 15
Australian Power and Energy Limited (APEL)		
APEL#2	IPH West Field Project, Supplementary Presentation	Day 13
CRC for Clean Power from Lignite (CRC)		
CRC#1	GHG Emissions from the Power Station burning brown coal from Phase 2 of the Hazelwood Mine – Malcolm McIntosh, Manager Technology Development	Day 15
Environmental Defenders Office (VIC) Ltd (EDO)		
EDO#13	Submission on greenhouse gas issues, including comments by ACF and expert reports by Alan Pears and Hugh Saddler.	By email 21/01/2005
EDO#14	Trends in greenhouse gas emissions from Australian electricity generation, submission prepared by Hugh Saddler, Managing Director, Energy Strategies Pty Ltd	By email 21/01/2005 Presented Day 14
EDO#15	Potential for replacing Hazelwood with alternatives, particularly energy efficiency, Alan Pears Director Sustainable Solutions Pty Ltd	By email 21/01/2005
EDO#16	Energy efficiency: a key element in a Hazelwood replacement strategy. Alan Pears	Day 14
EDO#17	Submission on greenhouse gas issues by Barnaby McIlrath	Day 14
EDO$18	Victorian generator overview – Origin Energy Australia (extract from web site)	Day 15
EDO#19	Supplementary submission responding to revised Strategic Assessment Guidelines presented on behalf of IPRH	By email 14/02/05
Environment Protection Authority Victoria (EPA)		
EPA#4	Response to questions raised by the EDO	Day 14
GTL Energy Limited		
GTL#1	International Power Hazelwood West Field EES January 2005	Day 13
Gippsland Trades & Labour Council (GTLC)		
GTLC#1	Submission: Extension of Hazelwood Mine	Day 15
International Power Hazelwood (IPRH)		
IPRH#53	Revised order by Justice Morris, VCAT Reference P2257/2004	Dir Hrg

IPRH#54	Response to Department of the Environment and Heritage on request for reconsideration under Section 78 of EPBC Act (Effect on Rainfall in Gippsland Lakes Catchment)—including CSIRO report by P H Whetton and P J Durack dated 1/12/2004	By Email 21/12/2004
IPRH#55	Supplementary Information on Greenhouse Gas Emissions from Hazelwood Power Station—including: Attachment A: Strategic Assessment Guidelines prepared for IPRH by Matrix Planning; Attachment B: Strategic Assessment Guidelines prepared by Latrobe City Council (see also Attachment 1 to LCC#2) Attachment C: Report on Independent Verification of the Greenhouse Challenge Program 2002; Attachment D: International Power Hazelwood's Annual Report on the environment, health & safety and community 2003; Attachment E: Climate Change in West Gippsland (DSE 2004); Attachment F: (See IPRH#54 above)	By email 5/01/2005
IPRH#56	Presentation on GHS from HPS, David Quinn, CEO, IPRH	Day 12
IPRH#57	Impact of a carbon cost on Australia's electricity generation. ESAA Generation Directorate	Day 12
IPRH#58	Energy and Greenhouse Action Plan Approval (letter from EPA dated 19 October 2004 and attachment tabled by IPRH)	Day 13
IPRH#59	Answers to questions from Panel and EDO	Day 14
IPRH#60	Spot prices and HPS supply, 4 & 5 August 1998	Day 14
IPRH#61	Closing submission	Day 15
IPRH#62	Amended Strategic Assessment Guidelines	By email 7/02/05
IPRH#63	Amended CSIRO Report	By email 12/2/05
IPRH#64	Supplementary questions from the Panel 13 February 2005	By email 20/02/05
Mineral Council of Australia (MCA)		
MCA#1	The Fraser Institute Annual Survey of Mining Companies	Day 14
MCA#2	Towards Victoria's Clean Energy Future (ACIL Tasman)	Day 14
MCA#3	Principles for Managing Climate Change	Day 14
MCA#4	Enduring Value – The Australian Minerals Industry Framework for Sustainable Energy	Day 14
MCA#5	Government Business — Business Climate Change Dialogue	Day 14
MCA#6	Address to Melbourne Business Club by John Pizzey	Day 14
MCA#7	Chris Fraser and Peter Morris, Minerals Council of Australia. Speaking notes to the Independent Panel Inquiry into greenhouse gas matters associated with the Hazelwood Power station	Emailed 4 February 2005

* Note: The entries in Column 3 refer to the following days of the Panel Hearings, except where material was received by email:

Dir Hrg	Directions Hearing Friday 17 December 2004		
Day 12	Monday 24 January 2005	Day 14	Tuesday 1 February 2005
Day 13	Tuesday 25 January 2005	Day 15	Wednesday 2 February 2005

E. VCAT REFERENCE NO P2257/2004

F. TYPE 1 PRO-FORMA SUBMISSION

G. OUTLINE OF TERRESTRIAL FLORA AND FAUNA MONITORING PROGRAM FOR NET GAIN OFFSETS