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30 July 2007

Wyong Strategic Inquiry Panel Secretariat
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GPO Box 39
SYDNEY NSW 2001

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Dear Mr Downes

The NSW Minerals Council (NSWMC) welcomes the opportunity to make a submission to the Independent Expert Panel – Strategic Inquiry into Potential Coal Mining Impacts in the Wyong LGA (the Panel). The Panel provides an opportunity for experts to provide a science based assessment of the potential impacts of mining and determine the appropriate future of the industry in the area.

The attached submission presents the views of the NSW minerals industry and has been developed in close consultation with collieries that have interests in the Wyong LGA. The submission provides a strategic review of the mining industry in the area including: key regional and State economic and social information for the industry; environmental impacts assessment and management techniques used by the industry; and some of the regulatory frameworks within which the industry operates. Importantly, it provides evidence of why strategic planning by the government should account for the value of coal resources in an area, and that any mining proposal should be assessed on its individual merits as part of the rigorous planning approvals system that exists in NSW.

The submission also makes some recommendations of how the industry can increase the Government's confidence about how decisions relating to mine plans are made, and how the rigour and merit of the processes can provide enhanced community confidence in outcomes.

NSWMC is available to assist the Panel throughout this process. We look forward to future discussions with Government about the potential implementation of the Panel's recommendations.

For further information, please contact Georgina Beattie, Deputy-Director Environment & Community, on (02) 8202 7205 or gbeattie@nswmin.com.au.

Yours sincerely

Dr Nikki B. Williams
CHIEF EXECUTIVE OFFICER

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NSW Minerals Council

Submission to the Independent Expert Panel – Strategic Inquiry into Potential Coal Mining Impacts in the Wyong LGA

July 2007

Executive Summary

NSW is in the unique position of possessing vast reserves of high quality, economically recoverable coal. The State's economy has developed using affordable, reliable electricity generated by coal-fired power stations. In export markets, there is high demand for NSW's coal as a result of growing electricity and construction demands internationally, coupled with NSW's reputation as a high quality producer, with reliable supply chains, using world class infrastructure.

There is no denying that the coal industry makes a significant contribution to both the economic and social prosperity of NSW residents, and that mining companies play active, positive roles in the local communities in which they operate. The Wyong area is the last major undeveloped deposit of good quality, potentially mineable coal in the Newcastle Coalfield, and presents a significant opportunity to the local community in terms of employment, infrastructure and other community contributions, with flow on benefits extending throughout the State.

There are many complex, site specific factors that can affect the extent and magnitude of mining related impacts on both the natural and built environment. The assessment of mining proposals in the Wyong LGA should be undertaken on a case-by-case basis using a trade-off between all environmental, social and economic factors. This allows the Government to make decisions based on the net benefit to society, including the acceptability of impacts. The existing approvals process in NSW provides a comprehensive mechanism to do this.

Some of the key points raised in response to each of the Terms of Reference for the Panel are outlined below.

1. Mining has successfully taken place in drinking water catchments and under stored waters in NSW

- While not currently proposed for the Wyong LGA, it is worthwhile to note that there are many instances of successful underground mining directly beneath stored waters, including current operations beneath the nearby Lake Macquarie.
- The Stored Waters Inquiry of 1976 found that "successful sub-sea and sub-lake mining is well documented in the Newcastle Coalfield, with depths of cover from 36m to 180m, with no enhanced water entry problems." There is no reason to believe that mining under the stored water in the Mardi Dam, with even greater depths of cover, would result in any loss of water, provided appropriate mine design and other mitigation measures were employed.

2. The environmental impacts of coal mining can be managed to acceptable levels

- New projects should contribute to continual improvement of the environmental performance of the industry.
- A conservative approach is taken in the management of environmental impacts, and there are many mitigation and remediation techniques that can be employed to minimise environmental risks.
- Ground movements from underground mining at a point on the surface do not automatically result in adverse environmental impacts at that point.

3. Mining makes a significant contribution to both the local communities in which they operate as well as the wider region and State

- Coal mining has direct employment benefits, indirect employment benefits and the returns to Government through taxes and royalties.
- Royalties paid to Government from coal mining in the Newcastle Coalfield are estimated at $51 million per annum with other taxes and charges paid to Government estimated at $12 million per annum.
- By providing high paying employment opportunities and stimulating a range of sectors in the local economy, coal mining has the potential to reduce unemployment in the LGA.

4. Each mining proposal should be assessed on its individual merits

- The desirability of coal mining proposals in the Wyong LGA should be considered on a case-by-case basis where potential environmental impacts can be considered in detail and mitigation measures, including project design, can be designed to minimise impacts. The existing approval processes in NSW adequately cater for this.
- The assessment of environmental, social and economic benefits and costs of projects should be an open and transparent process. The results of assessment should be clearly and openly communicated to the community to give an understanding of the trade-offs made during assessment and the Government's determination on the acceptability of impacts.
- Blanket prohibitions of coal mining may result in economically efficient coal mining proposals being rejected, imposing significant opportunity costs on society for modest avoided environmental impacts.

NSWMC's recommendations to the Panel are as follows:

- The merits of mining coal in the Wyong LGA be considered on a case-by-case basis where potential environmental impacts can be considered in detail, and measures, such as project design, can be explored to minimise and mitigate impacts.
- The approval process for consideration of future mining proposals explicitly consider the trade-off between the economic and social benefits to the community and any environmental impacts including the likely impacts on water, of subsidence and on amenity. This need not go as far as placing economic values on environmental impacts, but should compare the different environmental outcomes achieved against the economic impact of various environmental restrictions.
- Environmental standards/restrictions for future coal mining also be considered on a case-by-case basis to enable the economic trade-off between environmental benefits of a standard/restriction and the opportunity costs of foregone coal production to be considered.
- Any future coal mining in the Wyong LGA should aim to maximise community benefits through:
  - Undertaking an effective Social Impact Assessment. Industry and government should work together to understand best practice approaches to Social Impact Assessment.
  - The inclusion of local councils in decisions affecting the local community.
  - Contributions to community infrastructure, groups and activities.
  - Local employment and purchasing policies.

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1 - Introduction

The NSW Minerals Council (NSWMC) is a major stakeholder in many of the environmental, social, regulatory and economic issues critical to the sustainable development of New South Wales. The industry has a demonstrable record of good environmental management and continuous improvement, in no small part due to co-operative, consultative and constructive approaches towards ensuring balanced development outcomes. NSWMC seeks to ensure that any environmental regulation and policy meets the basic criteria of effectiveness, efficiency and fairness.

NSWMC is the peak body representing mineral exploration companies and the producers of coal, minerals and extractive materials in this State. The NSW minerals industry has an annual production value of more than $11 billion. Mining and minerals production employs over 47,000 people directly in NSW, mainly in rural and regional areas, and provides indirect employment, estimated to be in the order of a further 200,000 people, in a large number of support industries ranging from heavy engineering and equipment manufacturing to the provision of mine supplies, consumable items and specialised advisory, design and management services.

The industry contributes over $1.5 billion per year to government revenues, with coal continuing to be the State's largest export earner at over $8 billion per year. The export of Australian mining equipment, technology and services is also significant and is estimated at over $5 billion per year.

NSW is in the unique position of possessing vast reserves of high quality, economically recoverable coal. The State's economy has developed using affordable, reliable electricity generated by coal-fired power stations and steel produced with coking coal from the State's Southern Coalfield. In export markets, there is high demand for NSW's thermal and metallurgical coals as a result of growing electricity and construction demands internationally, coupled with NSW's reputation as a high quality producer, with reliable supply chains, using world class infrastructure.

The mining industry is continually improving its approach to environmental sustainability including subsidence prediction, impact assessment and management. Several research projects have been undertaken through the industry's Australian Coal Association Research Program (ACARP) which have redefined best practice in this area. The Subsidence Management Plan (SMP) process, introduced by the NSW Government in 2004, has also improved rigour and transparency in the management of subsidence.

Despite these improvements, mining will result in some environmental impacts. This submission seeks to outline the science behind environmental management including subsidence, water and amenity issues; and policy recommendations that the industry believes would result in improved outcomes for all stakeholders. Ultimately, it is the government that must determine what level of environmental impacts are acceptable in light of the economic and social benefits of mining. The NSWMC believes that the planning approval process in NSW can effectively balance these factors in light of the principles of Ecologically Sustainable Development. The industry embraces such an approach.

This submission begins by discussing coal resources in the Wyong LGA and the strategic planning framework, then addresses each of the Terms of reference for the Strategic Inquiry.

2 - Background

2.1 Coal resources in the Wyong LGA

Coal production in NSW is predominantly based in 5 coalfields: Hunter; Newcastle; Southern; Western; and Gunnedah. The Wyong Local Government Area (Wyong LGA) falls within the Newcastle Coalfield, which extends north from Gosford, along the Central Coast to Maitland, and inland to Cessnock.

Coal mining has long been a part of the Central Coast's history, including Wyong. While current mining activities do not extend far into the LGA, coal reserves within the LGA have been identified for many years. The Wyong area is now the last major undeveloped deposit of good quality, potentially mineable coal in the Newcastle Coalfield, and the resource is estimated to be in the order of 1,030 Mt (DPI 2006). The depth of cover in the Wyong LGA (the depth of overburden from the surface to the targeted coal seams) ranges from 50 m to over 650 m.

There is a history of over 100 years of mining in the Wyong LGA. There are a range of mining titles that currently exist in the LGA, however, there is currently only one mine that is extracting coal – Chain Valley Colliery. A summary of the mining titles that extend into in the LGA are summarised below:

- Munmorah Colliery
  - Operated by Centennial Coal
  - Currently under care and maintenance and being decommissioned
- Chain Valley Colliery
  - Operated by Peabody Mining via Bord and Pillar methods
  - Approximate remaining reserves of 2.6 Mt
- Myuna Colliery
  - Operated by Centennial Coal via Bord and Pillar methods
  - Approximate remaining reserves of 27.9 Mt
- Mandalong Colliery
  - Exploration Licence in Wyong LGA
- Mannering Colliery
  - Operated by Centennial Coal via Bord and Pillar methods
  - Approximate remaining reserves of 7.2 Mt

In addition, the proposed Wallarah No. 2 Project aims to access some of the remaining coal resources in the south and west of the Wyong LGA through the development of a longwall mining operation. This project seeks to access a previously undeveloped thermal coal resource of some 878 Mt over a mine life of 42 years.

Further details on mining in the Wyong LGA are provided in Section 5.

2.2 NSW planning framework

Strategic planning instruments recognise the value of NSW non-renewable minerals and other extractive resource wealth. The instruments facilitate the extraction and processing of these resources following adequate assessment and consideration of environmental and other impacts.

NSW's strategic planning framework sets out long term land use plans for defined areas, including areas for residential, commercial and industrial development. Strategic plans give the community certainty about future land use and allow other government agencies to plan accordingly.

Underlying the strategic planning framework, NSW has a rigorous approval system in place that supports detailed assessment of proposed mining projects. There are many different environmental, social and economic factors that combine to make each proposal unique. The planning system accounts for these differences, allowing each project to be assessed on its own merits. A risk based assessment approach, based on the Precautionary Principle, is applied when considering any new mining proposal. Specific risks are identified during the application process, and appropriate mitigation and management strategies, including the rejection of the proposal, can be implemented to ensure these risks are reduced to acceptable levels.

Mine Subsidence Districts (MSDs) are areas where intensive underground coal mining has been carried out, is in progress or where significant reserves exist, and are designated by State Government. MSD's have existed in the Wyong LGA for almost 20 years, with the Hue Hue MSD proclaimed in 1988 and the Wyong MSD in 1997. Approval from the Mine Subsidence Board is required for most substantial building works proposed in an MSD to ensure structures are appropriately designed to co-exist with underground mining. There are many productive land uses that can co-exist with mining, which has been demonstrated in many other coal mining regions. For example, in the Hunter Valley there is underground mining in areas of farming, vineyards, and rural residential land use.

Fundamental to the current system is the requirement to ensure an appropriate balance between the impacts of development and the social and economic benefits, consistent with community expectations. A summary of the strategic regulatory framework relevant to coal mining is provided in Appendix 1.

2.3 Community Consultation

Community consultation throughout the various stages of a project is vital to ensure acceptance by the local community and a successful project. Community consultation by mining companies is largely driven by the regulatory requirements of the various stages of the project.

Public consultation is an integral part of any proposed mine's approval process. The process for obtaining development consent or planning approval includes extensive provisions for public consultation and input into the development of specific projects.

The NSW mining industry is committed to fostering positive relationships between mines and the communities in which they operate. Best practice community engagement is strongly supported throughout the industry, and NSWMC helps facilitate the continual improvement of community engagement practices. Indeed, NSWMC has developed the "Community Engagement Handbook – Towards Stronger Community Relationships", and a training course to assist the industry with its community engagement.

The industry's annual Environment and Community Conference last year hosted the inaugural Excellence Awards presentations, which recognise outstanding environmental and community initiatives that go beyond regulatory requirements and set new standards for best practice in the industry. Industry initiatives such as these demonstrate the proactive approach taken by the NSW mining industry to work with communities and develop mutually beneficial outcomes.

Community engagement is typically undertaken throughout each stage of a project as summarised below.

- **Exploration** – Initial consultation with the local community during the early stages of project planning is essential to develop a long-term sustainable relationship with stakeholders in the neighbouring community. These relationships allow mining companies to gain the community's trust and to understand the issues associated with the project and ways in which these issues may be managed throughout the life of the operation. Typical consultation activities at this stage of the process include: advertisements in newspapers; newsletters to stakeholders; and the establishment of a Community Consultative Committee (CCC).

  A Community Consultative Committee (CCC) provides an effective way to communicate the progress of the project and to work together to resolve any issues that may arise during the course of the project. The establishment and operation of a CCC is required once a project is approved, but is often established at exploration stage. DoP has drafted guidelines '*Community Consultative*

Committees for Mining Projects approved by the Minister for Planning Under the EP&A Act" (DoP, 2005) to assist mining companies in developing and operating a successful CCC.

- **Planning Approval** – Best practice consultation with the community is typically undertaken by organising individual one-on-one meetings with those who wish to be consulted, with the distribution of project newsletters and providing presentations to community groups (e.g. Chamber of Commerce, local council environment committee etc).
- **Development & Operation** – As it is the longest stage during the life-cycle of a mine, continued consultation and engagement with stakeholders is typically undertaken. Such consultation may take the form of:
  - Regular CCC meetings, which provide information on all aspects of the mining operations, and provide the opportunity to discuss community concerns and develop appropriate mitigation measures;
  - Provision of information regarding the operation on a website;
  - Distribution of regular community newsletters;
  - Regular Open Days at the operation to keep the community informed and provide an opportunity to ask questions;
  - Involvement in community events, such as environmental groups, local clubs, sporting teams, etc; and
  - Assistance to the community by providing economic support.
- **Mine Closure –** It is essential that effective planning and consultation with stakeholders is undertaken well before the mine is planned to be closed. The mine closure plan requires a description of consultation undertaken with the local community (including regulators, CCC and adjacent neighbours) and ensures that all issues are identified and managed consistent with the expectations of these stakeholders.

The following four sections of this submission will specifically address each of the Panel's Terms of Reference.

3 - Coal mining under the Mardi Dam catchment

Terms of Reference *– Whether coal mining under the catchment for the Mardi Dam would compromise, in any significant way, the water supply of the Central Coast.*

3.1 Central Coast water supply

The current drought has significantly affected water storage levels in the Central Coast's drinking water supply reservoirs. It is important to note that the NSW minerals industry is a leader in efficient water management, and is continually looking at innovative ways to reduce its water consumption. Water security is a critical business issue, and improving the efficiency of water use is an important business strategy to ensure secure water supplies in the future. Many mines recycle a significant amount of their water for reuse on site, with some mines recycling up to 80% of water used. In other cases, mines source water from external effluent streams, with some mining operations sourcing up to 50% of their water needs from local town effluent. The industry has also developed extensive water sharing systems both between sites and with other industries, which reduces reliance on other forms of fresh water supply. For example, in the Western Coalfield the industry provides excess water to power stations, to town water supply and also returns it to streams to supplement environmental flows. These practices reduce demand on water withdrawn from the environment, and create other positive environmental outcomes.

The economic value produced from water used by the minerals industry is far higher than any other industry. The minerals industry has an average value of $80/m³ of water used, compared to $40/m³ for the industrial sector and $5/m³ for the agricultural industry (CSIRO 2007).

There are many other human land uses within the Wyong LGA other than coal mining. Each land use has impacts on the environment, such as:

- Extraction of water from the environment
- Water quality issues as a result of nutrient discharge from agriculture
- Erosion and water quality issues resulting from free ranging stock
- Management of water storage and river flows in the water supply catchments, resulting in altered flow regimes and increased barriers to fish passage
- Urban runoff and discharge from sewage and septic systems leading to water quality issues

When assessing the future of mining in the Wyong LGA, it is important to consider the environmental impacts of mining relative to other environmental impacts in the region, and the economic value created by mining relative to alternative land uses.

3.2 Mardi Dam

The catchment for the Mardi Dam is a minor part of the total catchment for the Gosford-Wyong Joint Water Supply System. The contributing catchment for the dam is 4km^2, representing less than 1% of the total catchment area. A summary of the water storage reservoirs in the system and their catchment areas is shown in Table 1.

Table 1 – Storage reservoirs in the Gosford-Wyong Joint Water Supply System (www.gwcwater.nsw.gov.au)

Storage	Capacity (ML)	Capacity %	Catchment Area (km^2)	Catchment %
Mangrove Creek Dam	190,000	93.73%	101	13.89%
Mardi Dam	7,400	3.65%	4	0.55%
Mooney Dam	4,600	2.27%	39	5.36%
Wyong River	300	0.15%	355	48.83%
Mangrove Creek	300	0.15%	140	19.26%
Ourimbah Creek	100	0.05%	88	12.10%
	202,700		727	

Mining has successfully taken place in drinking water catchments in NSW. While not currently proposed for the Wyong LGA, it is worthwhile to note that there are many instances of successful underground mining directly beneath stored waters. Booth (2002) notes "the successful operation of longwall mines under lakes and seas convincingly demonstrates that a confining zone normally exists and that highly permeable fractures directly connecting the mine to the surface generally do not occur." This is demonstrated in the Wyong LGA with the operation of Mannering Colliery under Lake Macquarie without experiencing any enhanced water entry. Myuna Colliery is also currently mining successfully under Lake Macquarie.

Of particular relevance in this regard is the finding of the Stored Waters Inquiry of 1976 by Justice Reynolds (the Reynolds Inquiry) that "successful sub-sea and sub-lake mining is well documented in the Newcastle Coalfield, with depths of cover from 36m to 180m, with no enhanced water entry problems." The coal resource beneath the Mardi Dam is deeper, and given near-surface impacts generally reduce with greater depths of cover, there is no reason to believe that mining under the stored water in the Mardi Dam would result in any loss of water, provided appropriate mine design and other mitigation measures were employed. Mining beneath the dam wall structure itself may be challenging, but this could only be determined once detailed mine plans are known and the specific details are assessed.

Environmental assessment and impact management for underground mining is discussed in detail in Section 4. However, it is important to note that a conservative approach is taken in the management of environmental impacts, and there are many mitigation and remediation techniques that can be employed to minimise environmental risks. This means that the design of an individual project can be tailored to meet outcomes which are deemed acceptable in the particular circumstance, and it can be said with confidence that with the appropriate management systems in place the desired outcomes will be achieved.

In the unlikely event that impacts exceed those predicted and accepted as part of project approval, and negative impacts to the surface water or groundwater resources within the Mardi Dam catchment were to occur, the risk of significantly compromising the water supply of the Central Coast is minimal.

4 - Environmental impacts of underground coal mining

Terms of Reference *– Environmental impacts of any underground coal mining, with a particular emphasis on:*

- *surface and groundwater resources, especially on drinking water supply and flooding*
- *hazards and risks of subsidence impacts*
- *the amenity of the community, including dust and noise impacts*

The industry's mining proposals are subject to rigorous environmental assessment in consultation with various regulatory bodies and other stakeholders. This process takes full account of environmental factors such as emissions, land and water management, mine subsidence, rehabilitation requirements, biodiversity management and local amenity issues. Projects are required to obtain numerous approvals, permits and licences to operate, and more generally need to meet community expectations throughout exploration, planning, operation and decommissioning stages in order to maintain their 'social licence to operate'.

4.1 Impacts on surface and groundwater resources

Underground mining, particularly longwall mining, has successfully occurred in the Wyong LGA, Newcastle Coalfields, Western Coalfields and Southern Coalfields without any adverse or long-term impacts on surface water and groundwater resources or drinking water supplies. The comprehensive water licensing regime ensures impacts on surface and groundwater resources are managed and mitigated.

A general discussion of the potential effects on surface and groundwater resources follows.

4.1.1 Surface water

Subsidence can cause fracturing and/or increased porosity in the shallow near-surface strata. As the distance between an extracted longwall panel and a stream reduces, the amount or degree of subsidence movements gradually increases. When full extraction occurs directly beneath streams and immediately adjacent to streams, the amount or degree of subsidence movements increase. However, the impact from mining is dependant upon the local features and the mine design proposal.

Longwall mines have operated successfully under large water bodies, including under Lake Macquarie. As discussed in the previous section, Booth (2002) notes that "the successful operation of longwall mines under lakes and seas convincingly demonstrates that a confining zone normally exists and that highly permeable fractures directly connecting the mine to the surface generally do not occur." This is demonstrated in the Wyong LGA with the operation of Mannering Colliery under Lake Macquarie without experiencing any enhanced water entry.

Some of the well-publicised impacts in the Southern Coalfield are unlikely to be experienced in the Wyong LGA, based on current mine plans. Cracking of creeks and river beds in the Southern Coalfield is due to valley closure and bulging (discussed in further detail below), and proposed mine plans are not in close enough proximity to the Yarramalong and Dooralong valleys to create this type of subsidence mechanism.

4.1.2 Flooding

Flooding impacts can be accurately predicted utilising computer-based models, designed on local hydrogeological and surface water properties. As with predictive groundwater modelling, flooding models are well accepted by regulators and provide the best technique to predict and proactively manage impacts, by way of orientation and design of the mine plan.

Flood studies of the major catchments of Yarramalong and Dooralong Valleys found both the Yarramalong and Dooralong Valleys are significantly flood prone and subject to regular inundation to significant depths. However the average flood velocity is low due to the width of the floodplain. The Hue Hue Creek floodplain is different as the flood depths are significantly less, with the majority of flood prone land located in rural or public open space areas of the catchment rather than in rural residential areas.

As a result of subsidence, any increased flood risk from ponding, inundation and flood depth needs to be proactively managed by way of mine plan symmetry and orientation, comprehensive and best practice SMPs, and the implementation of a monitoring and maintenance program to keep the subsided area free-draining. If ponding is predicted or does occur, then remediation needs to be appropriate and effective.

Potential flood impact is one of the most significant aspects requiring detailed assessment. Mandalong Mine has developed a state-of-the-art flood model. Mining to date has shown no significant impacts on the flooding regime in the Mandalong Valley. The development of such a tool provides the ability for detailed flood impact assessment. This type of tool is essential for mining proposals under flood plains.

4.1.3 Groundwater

It is recognised that groundwater storage and flow in the Newcastle Coalfield is predominately associated with the coal seams, and that the overburden and interburden rocks are of extremely low permeability. Forster and Enever (1992) reinforce this by noting that "neither the Narrabeen Group nor the Newcastle Coal Measures contain any significant quantities of groundwater and their permeabilities are known to be generally low (<10-7m/s)." Forster et al (1997) reaffirmed the results from 1992 by conducting a testing program near Mandalong Mine which "confirmed the very low permeability of the overburden strata above the Wallarah/Great Northern Seam" and that "there are no widespread aquifers present in the overburden above the Wallarah/Great Northern Seam, apart from the surface weathered rock aquifer and the alluvial aquifer". Therefore, the hydrogeological properties of groundwater resources in the Wyong LGA render them highly unlikely to experience any surface connectivity, thereby negating any potential impacts on the drinking waters of the region.

Underground mining can also contribute to other impacts on surface and groundwater resources. These may include changes in groundwater flow and water quality. As Merrick (2007) notes, "low permeability materials [*as experienced in the Wyong LGA*] will sustain a steep, tight cone of depression. Falls in the water table are unlikely to result from a drainage mechanism, unless the depth of cover is thin." The NSW Scientific Committee (2005) further notes "if the coal seam is deeper than approximately 150m, then water loss may be temporary unless the area is affected by severe geological disturbances such as strong folding."

Whilst minor impacts on surface water and groundwater resources may occur in the Wyong LGA, available hydrogeological evidence demonstrates that there are no significant mechanisms present in the area to adversely impact surface and groundwater resources over the long-term, provided appropriate mine design and management systems are in place. Accurate and predictive site-specific numerical modelling, coupled with appropriately designed mine plans, comprehensive SMPs, monitoring programs and proactive management can allow underground mining (in particular longwall mining) to occur in the Wyong LGA minimising any adverse impacts on surface and groundwater resources. However, each proposed mining development in the Wyong LGA needs to be adequately reviewed and assessed on a case by case basis due to the influence of a variety of factors.

The loss of groundwater to a mine is not only an environmental issue, but also a significant safety and operational issue. The entry of water into mine workings has the potential to place mine workers at risk of serious injury or death. Less significant water inflows have the potential to delay production, resulting in the loss of income for mine operators. This is another reason to demonstrate that intersection with ground water is not in the interest of the mining industry.

4.2 Hazards and risks of subsidence impacts

Mine-induced subsidence occurs when coal is extracted from underground coal seams, creating a void. The overlying strata are allowed to collapse into the void, causing the overburden to subside and ground movements at the surface.

There are a number of different methods of underground mining which can all potentially lead to varying levels of subsidence. In the Wyong LGA, underground mining has included bord and pillar extraction as well as longwall operations.

Subsidence behaviour varies widely depending on a number of factors specific to each individual situation. Some of the factors influencing subsidence behaviour include:

- **Regional differences in geology** – Regional geological variations result in differing subsidence behaviour between different coalmining regions. The Reynolds Inquiry noted that subsidence behaviour varied significantly between the Newcastle Coalfield, Western Coalfield and the Southern Coalfield.
- **Local differences in geology and topography –** Local geological and topographical variations can also affect subsidence behaviour. For example, the presence of isolated geological features such as faults or particular characteristics of a stream that make it more susceptible to cracking.
- **Aspects of mine design** – Aspects of mine design such as longwall orientation, longwall widths, pillar widths, extraction height, depth of cover and the proximity of mining in relation to significant features all have an impact on the behavior of subsidence. Altering these aspects of mine design is a tool that can be used to manage the impacts of subsidence.

The economic value of coal reserves also varies. Some coal reserves are more economical to extract than others, leading to a greater economic and social benefit from their extraction. Applying the same environmental restrictions to all coal reserves would result in vastly different opportunity costs from the forgone coal production and downstream value without necessarily gaining significant environmental benefits.

4.2.1 Subsidence Management Plans

The design of an environmentally responsible mine plan, which considers all environmentally sensitive features of the proposed mining area and the results of predictive modelling assessments is the best mechanism to proactively mitigate environmental impacts, and is a requirement of planning approval. The project approval process and preparation of a Subsidence Management Plan provide further assurances that a proposed mine plan has acceptable environmental impacts.

Mining lease conditions require underground mines to prepare Subsidence Management Plans (SMPs) for all potential mining-induced subsidence impacts. Approval of SMPs is required from the Director-General of the Department of Primary Industries (DPI). Environmental Assessments prepared under Part 3A of the EP&A Act also require a consideration of environmental risks.

Preparation of SMPs is directed by DPI's "Guidelines for Applications for Subsidence Management Approvals". A SMP essentially involves:

- An outline of the mining system and resource recovery
- Characterisation of surface and subsurface features within the Application Area
- Subsidence prediction
- Assessment of likely subsidence impacts (consequence and risk)
- Proposed subsidence management.

This process includes consultation with the community and relevant state and local government bodies.

The planning process is effective in identifying and managing environmental risks. The same system should apply to the Wyong LGA, allowing assessment of projects on a case by case basis, taking into account the specific project design in each individual situation. However, there are improvements that could be made to the current system which will be discussed in Section 5.

With the preparation of an appropriate mine plan, accurate prediction of environmental impacts and the implementation of a comprehensive monitoring and management program, underground mining can be successfully undertaken without any long-term environmental impacts. However, it is critical that every proposed mining development is assessed on a case by case and that appropriate mitigation strategies are implemented to minimise adverse environmental impacts. Predictive modelling, coupled with appropriate mine plan design, is the most useful and proactive mitigation measure available in this regard.

4.2.2 Subsidence prediction

Despite claims to the contrary, the science of subsidence prediction is robust. Subsidence prediction models are designed to provide a range of possible subsidence values rather than attempting to

provide absolute values. For this reason, observed levels of subsidence are within predicted levels in the vast majority of cases.

The precautionary principle

One of the guiding principles of the National Strategy for Ecologically Sustainable Development is the "precautionary principle".

Because of the complex nature of subsidence, predicting precise values of subsidence at specific locations is not feasable – similar to many other types of forecasting activities. It is for this reason that subsidence models provide conservative predictions. This conservatism accounts for the uncertainty involved in prediction, and gives decision makers the confidence required to assess environmental risks and consider the risks in an assessment of the benefits of a project to society. This information will help to choose appropriate measures to reduce risks to acceptable levels and improve the net benefit of the project to society (such as mine design, mitigation, and remidiation measures).

Where impacts do occur, it is important to determine if they were predicted and approved as part of the assessment process. Where some of the more publicised subsidence impacts have occurred, no impact assessments were actually completed prior to mining because of the regulatory and social environment at the time. These instances are not appropriate to be used as examples of contemporary subsidence prediction and management.

4.2.3 Impacts of subsidence

After ground movements have been predicted, assessments are made regarding the potential impacts of these movements on the receiving environment. When assessing the impacts of subsidence, the nature of the impacts and the nature of the receiving environment is important to consider:

- **Impacts may be temporary** – Natural or artificial rehabilitation may result in different levels of impact in the short term to those that may occur in the medium to long term. In the majority of cases, the economic and social cost of avoiding all impacts has outweighed the environmental/social benefits.
- **Impacts may be localised** – The impacts may be localised and not significant in a regional context.
- **The nature of the receiving environment varies** – Environmental and social values vary widely from place to place.
- **Impacts are relative to other natural and anthropogenic processes** – It is important to try to differentiate what is an impact of mining, what occurrences may have been accelerated by mining and what occurrences have occurred naturally. For example, it can be difficult to distinguish between mining-induced changes and natural variability occurring within the environment.

It is important to emphasise that mining induced ground movements at a point on the surface do not automatically result in adverse environmental impacts at that point (MSEC 2007). It is possible for ground movements to occur as a result of underground mining without the occurrence of cracking e.g. far-field movements. Some of these movements are only detectable with the use of specialised monitoring equipment and are only of a concern for major infrastructure such as dams or bridges (MSEC 2007). Where ground movement results in subsidence effects (e.g. cracking), the effect may alter the social/aesthetic value of an area, however it does not in all cases result in environmental impacts.

Given the complexities, it is difficult to predict precisely where impacts such as fractures may develop in response to mine subsidence. However, monitoring of past mining provides a good level of confidence for predicting the likelihood, style and extent of fracturing due to longwall mining. Conservative predictions, described in probabilistic terms, also ensure the industry has a good estimation of likely impacts.

4.2.4 Subsidence impact mitigation and minimisation

Mitigation/minimisation of subsidence-induced impacts can successfully be achieved through a number of methods. These can be passive methods, such as mine design and layout, or more active methods that require intervention to mitigate levels of environmental impact. A summary of the methods available to mitigate impacts on streams is provided below, and these techniques can similarly be applied to other significant features

- **Longwall Setback –** The level of impact typically reduces the further a longwall is setback from a stream, as the magnitudes of subsidence, upsidence and closure movements reduce. The appropriate setback between longwalls and streams varies in each case, and setbacks may not always be appropriate.
- **Longwall Design –** Impacts to streams can be reduced if longwall widths are narrowed and pillar widths are increased where longwalls pass directly beneath streams. While narrow longwalls and wide pillars are less economical, less coal can be sterilised when compared to a solid barrier of coal under the feature. Alternatively, it is possible to reduce the width of longwalls in the vicinity of streams while maintaining more economical longwall widths for the remainder of the longwall.
- **Overburden Grout Injection –**This trial method attempts to fill voids within the overburden before other upper horizons subside into them. It is achieved by drilling holes from the surface and injecting grout just ahead of the longwall face into targeted strata layers. The method has been successfully adopted in China and is currently being investigated in Australia through ACARP funding. The method will not reduce subsidence to zero. There are also significant groundwater and mine safety issues to address with this methodology.
- **Controlled water flow –** The introduction of controlled or regulated flows can minimise short term impacts on a stream and its ecology by maintaining water levels in pools during mining. The method is not feasible as a long term mitigation measure and remediation of surface flow diversion sites must still be undertaken.
- **Monitoring –** Monitoring is conducted on ground movements, stream flows, water quality, ecosystem health and visual aspects. Monitoring can be a useful tool for impact prevention in the short and long term. There have been many cases where longwalls have mined towards sensitive surface features with triggers for actions, including contingency plans of stopping a longwall short if monitoring indicates that unacceptable impacts are imminent. Alternatively, monitoring during the mining of one longwall can be used to decide whether to alter the planned extent of subsequent longwalls. Monitoring is discussed further in the following section.

4.2.5 Monitoring of subsidence activity and subsidence impacts

The NSW minerals industry undertakes extensive monitoring on the impacts of underground mining. Monitoring is conducted on ground movements, infrastructure and other built features, stream flows, water quality, ecosystem health and visual aspects. A typical Water Monitoring and Management Program may contain the following information (Comur Consulting, 2006):

- A surface water budget of streams that may be affected by subsidence so that any loss of water can be predicted and quantified
- Relationships of water levels to ecological processes such as fish migration within streams subject to mining subsidence
- Descriptions of the water quality and flow characteristics of streams that may be affected by subsidence
- Trigger levels that may indicate unacceptable effects of subsidence and/or the need for remediation
- The main areas of current and expected water make within the mine workings
- Agreed monitoring locations for groundwater and dependent vegetation habitats
- Hydraulic characteristics of overlying and intercepted groundwater systems, and changes to ground/surface water due to coal extraction and dewatering operations
- Overlying groundwater dependent ecosystems and surface water environments and potential impacts from coal extraction and dewatering activities to these systems.

- Any pumping tests and groundwater simulation studies undertaken.
- Surface and groundwater monitoring, including: volumes extracted from mining areas, groundwater level, electrical conductivity, total dissolved solids, pH, alkalinity, turbidity, dissolved oxygen, temperature, iron, and manganese.

4.2.6 Subsidence impact remediation

Remediation of subsidence impacts may occur naturally, or may involve active intervention.

There are many cases where subsidence from mining under the built environment has been managed effectively. The Mine Subsidence Board (MSB) controls surface development approvals where development lies within declared Mine Subsidence Districts. When impacts occur, remediation is undertaken to the satisfaction of the MSB. In the Wyong LGA, Munmorah Colliery has mined under hundreds of homes during its years of operation. Experience to date has shown that property values in the housing market are not affected by subsidence. Mining has also occurred under infrastructure including transmission towers and many roads.

Where the conditions are right, the natural environment can naturally recover from impacts. Suitable conditions for natural stream remediation include consistent water flows, relatively flat gradients and the existence of a sediment or nutrient load. Natural remediation can occur over a long period of time, or in the short term following significant flow events.

A number of mining companies have sealed fractures in stream beds to minimise impacts on streams. Methods of remediation have steadily improved over time as a result of increased knowledge and experience and availability of improved sealing products. Early attempts to remediate some sites were less successful than more recent successful attempts, such as pattern grouting of rockbars in the Georges River in the Southern Coalfield. While remediation can minimise the long term impacts of mining, there remains a period during active subsidence where short term impacts under low flow conditions can still eventuate.

The discussion of subsidence mitigation and remediation needs to balance a number of pertinent issues. These include:

- The level of impact needs to be clearly quantified and deemed appropriate to warrant action. That is, subsidence may impact features that are of low ecological value such as already polluted drainage lines which may not warrant the implementation of expensive and long term monitoring and impact remediation.
- The level of required mitigation and remediation needs to be clearly understood both in terms of safety and also the impact the rehabilitation measures themselves may have. Active rehabilitation at remote locations may require the disturbance of otherwise undisturbed habitat. It will be important to ensure that the level of impact for the remediation is comparably less than the subsidence related impacts they seek to remediate.
- The level of 'background impact' on natural features needs to be well understood to ensure that rehabilitation activities are targeted at processes induced by mining and not natural or background processes. It is important that regulators and the industry alike consider the rate and prevalence of 'background impact' that may occur prior to the commencement of mining to ensure that inappropriate remediation is not required or applied.
- Any remediation activities need to be balanced with the existing land and water management strategies in order to ensure that the level of required and proposed remediation is commensurate with the impact of subsidence alone.
- The value of coal production forgone as a result of the mitigation or remediation measures needs to be compared to the predicted environmental benefits for not mining that coal i.e. the avoided environmental costs.

4.3 Local amenity

Environmental impacts are initially assessed during the planning and approvals process to determine if a project will cause or contribute to amenity impacts on the surrounding community. Assessments for previous underground mining operations have shown that amenity impacts, such as air quality and noise are considerably less than other forms of coal mining developments and provide comparably similar impacts to other industrial developments.

Limited ground disturbance due to the nature of underground mining, few processing requirements for the product coal and the presence of existing transport facilities have and will continue to result in far less amenity impacts from the mining and sale of coal in the Wyong LGA compared to other coal mining regions throughout NSW.

The design and operational procedures for a mine can be tailored to co-exist with the surrounding land uses in a region. Aspects such as the placement of above ground facilities, the types of transport used and the timing of nose and dust generating activities can all be designed to minimise the impacts on the local community.

4.3.1 Air Quality

Mining operations can affect air quality by emitting particulate matter into the air. Concerns over amenity impacts from particulate matter generated by coal mining are predominantly associated with open cut mines as the proportion of land disturbance is greater. Underground mines, which are those relevant to the Wyong LGA, produce much less particulate matter as the majority of activities with potential to generate particulate matter are located underground. Potential sources of particulate matter generated from underground coal mining are mainly large dust particles created from initial construction activities (short term) or from limited surface operational activities such as coal storage and handling. Fine particulate matter (such as PM2.5), is a greater concern for local communities than larger particulate matter such as dust. Fine particles are more prevalant from sources in urban areas.

Dust can have some health and amenity impacts for local communities. Steps are taken to minimise the level of dust emissions. Dust emissions are managed through use of enclosed conveyors, water sprays on stockpiles and the use of dust watering carts on unsealed areas. For underground mines, point source controls such as filters on ventilation shafts can also be used. Dust emissions are regularly monitored and communicated through Community Consultative Committees.

4.3.2 Noise

Underground mining and minerals processing operations can generate noise from a range of activities including transport, conveyors, coal handling plants and ventilation systems. Noise impacts need to be, and can be, managed carefully, particularly where mines operate in close proximity to other landholders and local communities.

Potential noise impacts from coal mining activities can be predicted using computer modelling to enable design modifications to reduce unreasonable noise impacts from coal mining activities prior to operations commencing. There are many effective noise management practices that can also be applied once the mining activities are operational that reduce noise impacts on local communities.

Extensive monitoring of noise emissions is typically undertaken to ensure that all regulatory requirements are met and to enable communication with local communities.

4.3.3 Regulatory Requirements

The NSW Government has developed comprehensive guidelines to assist mining companies adequately assess amenity impacts. Amenity impacts such as air quality and noise are assessed using widely accepted modelling software, in which worst-case scenarios for the operation are compared against the relevant impact assessment criteria. The ability to model potential impacts also enables re-design of project elements that may be predicting unacceptable impacts. Prediction of the worst-case impacts will then determine the viability of the project in relation to the proximity of the local community.

Monitoring of environmental impacts throughout the life of a mining project is undertaken in accordance with relevant Government Policy, Australian Standards, specific development consent conditions and/or the Environment Protection Licence (EPL). Amenity monitoring of air quality and noise is typically included in an environmental monitoring program and compares results to criteria imposed on the mining operation in the project approval and/or EPL. The monitoring data is required to be made publicly available and is reported annually and in some cases, monitoring data is required to be available on the internet. These processes, including the regular provision of data and updates to the CCC, provide a transparent process and encourage environmentally responsible mining.

5 - Social and economic significance of coal mining

Terms of Reference *– Social and economic significance of any underground coal mining to the local community, the region and State*

The coal industry makes a significant contribution to both the economic and social prosperity of NSW residents and mining companies play an active, positive roles in the local communities in which they operate. The mining industry in NSW's Newcastle Coalfield is no exception, having had a long history in the region providing thermal coal for domestic consumption and export.

5.1 NSW coal industry

Mining and minerals processing directly account for 2.5% of NSW's Gross State Product (DSRD 2007). In 2005-06 the NSW coal industry produced 161.3 million tonnes (Mt) of raw coal, yielding over 124.71 Mt of saleable coal. This accounted for over $7.0 billion in income, or 77% of the total value of the NSW mining sector (DPI 2006).

The majority of coal produced in the State is thermal coal, which is primarily used by electricity generators in both domestic and foreign markets. The remaining coal produced is a variety of coking (metallurgical) coals used in the production of steel (DPI 2006).

The primary market for NSW coal is the export market, with over 70% of coal produced exported during 2005-06 (DPI 2006). Exports of 89.8 Mt of thermal and metallurgical coal, 80% and 20% respectively, totalled approximately $6.7billion in value (DPI 2006) making coal the largest merchandise export in NSW (DSRD 2007).

The domestic consumption of 34 Mt of coal by the power, steel and other industries in 2005-06 totalled over $1.5 billion in value. The remaining saleable coal was placed in mining stocks (DPI 2006). Domestic consumption of coal in 2005-06 is given in Table 1.

Table 1 – Domestic Consumption of Coal 2005-06

	Kt	%
Electricity	28,503	84%
Steel	4,576	13%
Coke works	281	1%
Cement works	316	1%
Other consumers	426	1%
Total	**34,103**	**100%**

Source: DPI (2006)

The coal mining industry in NSW continues to be a major employer. At the end of June 2006 there were 12,658 people directly employed in the five coalfield regions across the State. This was an increase of 1,368 positions (10.8%) compared with June 2005 (11,290 positions) and the highest level of employment in the industry since 2000. Over the period from June 2000 to June 2006, employment in NSW coal mines rose 32% (3,075 jobs) (DPI 2006).

Over the past decade employees in the mining industry have consistently earned the highest average weekly earnings out of any sector in the NSW economy. During 2006, average full-time adult weekly earnings for employees in the NSW mining sector was $1,880.50 – 27% higher than the second ranked industry, and 67% higher than the average weekly earnings throughout all sectors of $1,123.30 (ABS 2006). The average wage in the NSW coal mining sector was even greater at $2,008.50 (DPI 2006).

Coal mining also contributes to State Government revenues via royalties and other taxes and charges. The royalty rate for coal is between 5-7% of the value of coal extracted. During 2005-06, royalties from the mining industry totalled $504 million, of which coal mines accounted for $447 million. In addition to royalties, mining companies pay other State Government taxes and charges such as stamp duty and payroll tax. During 2005-06, these charges amounted to $100 million bringing the funds paid to the State Government to a total of $604 million. This large contribution from the mining industry to State Government revenue creates benefits for all NSW residents. This revenue may be directed

towards public infrastructure, health facilities, education, social security, or one of the many other areas of State Government expenditure.

Forecasts for the NSW coal sector are strong, with the Australian Bureau of Agricultural and Resource Economics (ABARE) predicting continued growth in demand for thermal coal and coking coal (DPI 2006). Hence, NSW coal production is expected to continue to be a significant contributor to the State economy.

5.2 Coal mining in the Newcastle Coalfield

The Newcastle Coalfield contains a number of mines and mining proposals. A summary of relevant statistics for these mines in 2004-05 is provided below.

Table 2 – Newcastle Coalfield 2004-05

Mine/Proposal	Employment	Raw Production (Mt)	Saleable Production (Mt)	Coal Reserves (Mt)
Abel Proposal	-	-	-	182.00
Austar	106	0.00	0.00	48.00
Awaba	66	0.81	0.76	2.00
Bloomfield	65	0.81	0.49	22.70
Chain Valley	56	0.48	0.48	2.60
Donaldson	100	1.90	1.31	22.00
Mandalong	304	1.42	1.42	106.70
Mannering	40	0.16	0.16	7.20
Munmorah	136	0.56	0.56	-
Myuna	165	1.26	1.26	27.90
Newstan	300	2.88	2.31	53.70
Tasman Proposal	-	-	-	23.50
Wallarah No. 2 Proposal	-	-	-	878.00
West Wallsend	230	3.34	2.66	55.70
Westside	20	0.68	0.68	4.30
TOTAL	**1,588**	**14.30**	**12.09**	**1,436.30**

Source: DPI (2006)

Production in the Newcastle Coalfield accounted for 12.09 Mt, or 9.9% of NSW's total production of saleable coal in 2004-05 (DPI 2006) and 14.34 Mt or 11.5% in 2005-06. This is a significant proportion of the State's total output, and shows the importance of the Newcastle Coalfield to NSW's coal industry as a whole.

Royalties paid to Government from coal mining in the Newcastle Coalfield are estimated at $51M per annum with other taxes and charges paid to Government estimated at $12M per annum.

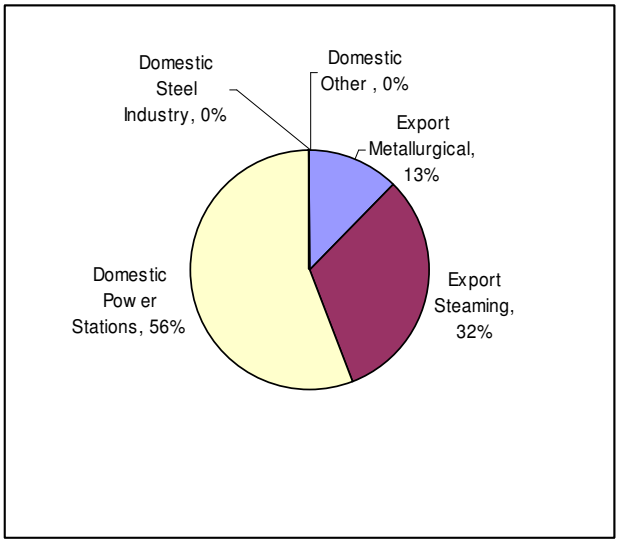

Figure 1 – Coal production in the Newcastle Coalfield
Source: DPI 2006

The Newcastle Coalfield primarily supplies thermal coal (88%) with the remainder metallurgical coal. 45% of the coal is exported including 99% of the metallurgical coal produced and 36% of the thermal coal. Exports in 2005/06 from the Newcastle Coalfield were valued at $530M.

From June 2004 to June 2006, employment in the Newcastle Coalfield rose 31% from 1,481 to 1,945 (DPI 2006). This growth in employment shows the strength of the coal mining industry in the Newcastle Coalfield.

5.3 Coal Production in the Wyong LGA

Wyong LGA has had a long history of coal mining. Munmorah Colliery which is located almost entirely within Wyong LGA is currently being decommissioned after 40 years of operation. Endeavour Colliery which operated for over 40 years has also been decommissioned and is in the final stages of rehabilitation.

Chain Valley Colliery and Mannering Colliery are the two main collieries that continue to operate within the LGA. Chain Valley Colliery has a capacity of 0.7Mtpa and in 2004-05 mined 0.48Mt and employed 56 people. Probable reserves are estimated at in the order of 2.6Mt. Thermal coal from Chain Valley Colliery is exported to Asia and Europe and also supplies Vales Point Power Station (DPI 2006).

Mannering Colliery has been operating for 45 years. It falls both within the Lake Macquarie and Wyong Local Government Areas (LGAs). The surface facilities are located three km South of the township of Mannering Park. Currently mining is occurring adjacent to Wyong LGA. Planning approval has been sought under Part 3A of the EP&A Act for continuation of mining up to 1.1 million tonnes per annum of coal. The current workforce of 90 employees will remain unchanged and all of the coal produced will continue to be transported via overland conveyor directly to Vales Point Power Station (Gillespie Economics 2007).

Myuna Colliery is located almost entirely within Lake Macquarie LGA although a small portion of the mining lease falls in Wyong LGA. Myuna colliery produces in the order of 1.26 Mtpa and has probable reserves of 27.90 Mt. The mine employs 165 people (DPI 2006). Coal from the Myuna Colliery supplies Eraring Power Station.

Mandalong Mine, which is located near Morisset in the Lake Macquarie area, currently produces around 3.5Mtpa. The mine also holds an exploration licence that extends into Wyong LGA. Exploration will determine the suitability of this resource for further mining and an application will be made under the appropriate planning regime should a project be viable.

The Wyong Areas Coal Joint Venture (WACJV) has been exploring the Wyong Coal Development Areas under licence of the NSW Government since 1995. This exploration has resulted in the

development of the Wallarah No. 2 Coal Project (W2CP) preliminary proposal which involves the underground extraction of up to 5 Million tonnes per annum of export quality thermal coal with associated surface facilities and infrastructure. The project comprises an underground longwall mine, a coal handling plant and storage facilities, rail loop and loading infrastructure, an underground drift entry, ventilation shafts and gas management facility. The Project will have a life in excess of 40 years.

Based on average export prices for thermal coal in 2005/06 and the average relationship between saleable coal and raw coal production in the Newcastle Coalfield, annual production at the W2CP will have a value in the order of $270m.

Based on average labour productivity for the Newcastle Coalfield (DPI 2006) the W2CP will provide ongoing employment for 500 people, many of whom will reside in the Wyong LGA. Temporary employment will also be provided during the construction phase.

5.4 Potential Flow-on Effects from the Coal Production in the Wyong LGA

Existing and future coal production in the Wyong LGA and adjoining areas will potentially have significant forward and backward linkages into the Wyong economy associated with both construction of mine sites and ongoing production.

Forward linkages refer to impacts on sectors or businesses utilising coal as an input to their production process or handling coal once it is produced. There are a number of significant forward linkages from coal mining in the Wyong LGA, namely to Vales Point and Munmorah Power Stations. Both power stations are located in the Wyong LGA and have been positioned close to their fuel source. Sourcing coal from the local mines has meant considerably reduced fuel costs, enabling Delta Electricity to generate electricity at relatively low costs. This efficiency is then transferred to the people of NSW through low cost energy to industry and individuals.

Backward linkages are associated with expenditure (purchases) that stimulates other sectors in the economy. This stimulus arises from:

- Production-induced flow-on effects associated with inter-firm trading. These arise where a coal mine purchase goods or services from other firms or industries in the region, which in turn generates demand for the inputs to production of these other industries and firms.
- Consumption-induced flow-on effects associated with household expenditure. These arise because coal mines employ labour and make payments to households. These households then acquire goods and services and so generate a stream of “consumption-induced effects complimentary to the production-induced effects” (Gillespie Economics 2007).

The main sectors impacted by flow-ons will depend on the specific expenditure profile of the mine projects as well as the expenditure profile of employee households. However, simple extrapolation from previous regional economic impact assessment studies by Gillespie Economics indicates that production-induced output flow-ons are likely to mainly be felt in the following sectors: property; wholesale trade; machinery and equipment; infrastructure; transport; mining services; and community services.

Consumption induced output effects are likely to be mainly felt in a range of different sectors including: retail trade; hospitality; property; communication; utilities; personal services; and community services.

Any coal mining in the Wyong LGA is therefore likely to provide a stimulus to many different sectors of the local economy.

5.5 Social significance of mining

Existing and future coal mining in the Wyong LGA may have a number of positive social impacts in the LGA:

- By providing high paying employment opportunities and stimulating a range of sectors in the local economy, coal mining has the potential to reduce unemployment in the LGA. Any reduction in unemployment in the region has the potential to have a positive impact on public health and crime since there is a correlation between unemployment and both criminal activity and drug and alcohol dependency.
- By providing work opportunities contributing to population movement into the region and retention of population in the region, coal mining may well have implications in relation to the provision of and access to a greater level of community infrastructure and human services, such as health and education facilities, since government provision of these facilities is fundamentally driven by population growth and demographics.
- Coal mining has a history of funding a range of community groups, activities and projects and in doing so contributing to the economic and social fabric of regions. Some of the areas funding is directed towards include: arts and culture; community welfare; education; environment; health, sport and recreation and community enhancement programs.

To better understand the social significance of mining in a particular area, a Social Impact Assessment (SIA) should be undertaken. SIA analyses the existing social and economic conditions of the proposed project area and the impacts the project is likely to have on these conditions. The SIA will include a socio-economic and demographic profile of the area; population projections; income characteristics; visual amenity; noise; air quality; and traffic and transport - and the likely impact of the project on these issues.

SIA for any project should ensure project proponents, affected communities and relevant government agencies can: recognise the likely negative impacts; harness the positives; take action that reduces the harm and damage and increases the advantages coming from the project; and get a full and fair picture of things if we are going to make things work better.

SIA aims to predict possible changes in local communities in ways that make the negotiation of change easier and more constructive for the affected communities. Effective SIA involves asking the community what their needs are, and developing partnerships to address these issues. The result of SIA sometimes identifies capacity building opportunities for the local community. The mining industry's use of SIA is still evolving, and there is an opportunity to improve practice in this area.

5.6 Future economic potential of the industry

A recent economic study by ACIL Tasman (2006) for the Minerals Ministerial Advisory Council investigated the economic potential of the NSW minerals industry. Using an economic model that forecast domestic and international economic conditions, the study concluded that given an appropriate regulatory environment the Newcastle Coalfield could increase exports at the rate of 8.9% each year over the years to 2020.

The estimated recoverable coal reserves in NSW total 10,790 Mt and include those resources where conceptual mine planning has been undertaken in mining lease and exploration licence areas. 1,440 Mt, or 13.3% of these reserves are located in the Newcastle Coalfield (DPI 2006). These figures do not include resources that are outside existing mining lease and exploration areas, and therefore this figure is likely to increase significantly in the future as further resources are identified and explored.

While coal resources in existing mining leases and exploration areas in NSW are sufficient to supply NSW needs well into this century, some collieries may need to close over the next 20 years as reserves within existing leases are depleted (DPI 2006). This highlights the need for continued access to new coal resources so that the local coal industry can continue to operate, as well as the local businesses and industries which they support. Importantly, future mining will create self sufficiency of employment in the Wyong LGA and the Central Coast more broadly. This will encourage income generated in the area to remain in the area.

One of the most important aspects of access to future reserves is an appropriate legislative framework that gives mining companies the investment certainty required for this capital intensive industry.

6 - Determining the future of mining in the Wyong LGA

Terms of Reference *– Areas where mining should not be permitted, or if permitted the conditions under which it may proceed, having regard to the matters listed above and the NSW Government's strategic planning policies that apply to the area.*

As previously discussed, the Wyong LGA has long been identified as a site for future coal mining, with Mine Subsidence Districts having existed in the LGA for almost 20 years. Land use in the area has evolved in this context.

Given that Wyong contains the last major undeveloped deposit of good quality, potentially mineable coal in the Newcastle Coalfield, attempts should be made to extract this resource, within reasonable environmental restrictions. The economic value created from the extraction of this resource will create significant benefits for both the local and broader NSW economy and community. The opportunity cost of sterilising coal reserves is likely to be significant, and without detailed environmental assessment of a project proposal, the benefits of such a policy would be questionable.

There is a stringent regulatory regime in place for mining approvals in NSW. The approval process contains numerous measures to ensure rigorous environmental assessment of proposed mines, taking into account the circumstances particular to each situation. The planning system has performed well in predicting, assessing and managing the environmental impacts of mining. A conservative approach is taken when predicting impacts in order to account for the inherent uncertainties involved in assessing complex environmental systems. In the vast majority of cases, observed impacts during mining have been well correlated with the impacts predicted in project applications.

Specific risks are accounted for in the planning process. The presence of environmental risks or critical infrastructure, such as dams, results in management actions to minimise these specific risks, whether it is a change in mine design, or a set of project approval conditions that prescribe how the risk should be managed. The optimal environmental restrictions can only be determined once the predicted environmental impacts of a specific project have been assessed.

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Minerals SEPP) was gazetted in February 2007, and introduced 'prohibited development' in Schedule 1. The only development listed in Schedule 1 to date is open cut mining in parts of the Lake Macquarie LGA. The industry does not support the inclusion of Schedule 1 into the Minerals SEPP and would strongly oppose any recommendations of the Panel that resulted in another area being added to this Schedule. Land use planning in areas designated for development should be managed through the standard planning system, with each proposal assessed on its own merits.

Prohibiting mining in the Wyong LGA, whether open cut or underground, would have no practical purpose. Proposals for open-cut mining in the LGA are extremely unlikely in the short-medium term, and therefore, placing a ban on open cut mining would not in any way change mining proposals and would only serve to set a bad precedent for other coal mining areas within NSW. There is also the potential that in the future, open cut mining may become economically and technically feasible. Eliminating the possibility of reaping these future benefits based on the current state of knowledge would be irresponsible.

6.1 Economic desirability of coal mining

At a strategic planning level and project level, the appropriate method for considering the economic efficiency (community desirability) of coal mining in Wyong LGA is benefit cost analysis (BCA). The essence of BCA is the comparison of the "with" scenario to the "without" or base case scenario and the identification and valuation of the incremental costs and benefits to the community, including environmental costs such as impacts on water resources, subsidence impacts and amenity effects. In other words, the social benefits of coal mining are compared with the social costs. It aims to encompass the full range of benefits and costs experienced by all members of the community, including those that may not be immediately expressed in monetary terms.

The concepts of benefit and cost used in BCA are very specifically related to the well-being of people and are carefully defined in economic theory. Well-being in economic theory is defined as arising from

both the consumption and production of goods and services. These goods and services may be many and varied and can be both marketed and non-marketed. The benefit derived by a consumer of goods and services is defined as the difference between what that person would be willing to pay for the good or service and what they have to pay. This is the “consumer surplus” and is relevant to the community’s valuation of environmental resources including water supply, environmental impacts of subsidence and amenity impacts.

The producers of goods and services can also generate surpluses. By combining resources in ways that increase their value to society, producers improve the well-being of the community. They create a “producer surplus”. It is the difference between the costs of the inputs used in the production process and the price received for the finished product. Producer surplus is the relevant measure of the value of coal production.

Both the consumer and producer surplus concepts relate to changes to the well-being of the people. If coal mining enables some of the people affected to experience greater consumer or producer surpluses, then these people are beneficiaries of the change. The extent of the change in their consumer and producer surpluses is a measure of their benefits. Conversely, if reductions in these surpluses are experienced, the people so affected are worse-off. The extent of the reductions in surpluses is a measure of the community’s costs.

Ultimately the incremental benefits of the resource re-allocation are compared to the incremental costs (using discounting to compare benefits and costs in different time periods). Only where the present value of benefits exceeds the present value of costs would coal mining be considered to be economically efficient. Where there are a number of alternatives, the option with the greatest net benefit is considered to be the most economically efficient and preferred on economic grounds.

A number of findings flow from this economic efficiency framework:

- Even at the strategic level, the community desirability of coal mining requires consideration of the costs and benefits which in turn require specific information about potential mining projects (including project design) and their likely impacts
- Recognising the data problems with applying benefit-cost analysis at a strategic level, the community desirability of coal mining in the Wyong LGA is best considered on a case-by-case basis after full evaluation of the specifics of individual proposals and their likely impacts
- Blanket prohibitions may result in economically efficient coal mining proposals being rejected, imposing significant opportunity costs on society for modest avoided environmental impacts
- Most potentially unacceptable environmental impacts of coal mining can be avoided or minimised via project design or a range of mitigation methods
- The existence of environmental impacts, even significant environmental impacts, is not sufficient justification to reject a coal mine proposal. What is relevant is the comparison between the net production benefits of coal mining (producer surplus) and the environmental impacts (consumer surplus)
- Where the net production benefits of coal mining exceed environmental costs and hence the project is desirable from an economic efficiency perspective, some of the net production benefits can be used to mitigate and remediate environmental impacts to an acceptable level. This can be implemented via consent conditions.

6.2 Environmental standards/restrictions

From a regulators perspective it is tempting to establish standards to be imposed on any new mining development. However, standards inevitably involve opportunity costs to society. In the case of coal mining, these opportunity costs would relate to foregone producer surplus associated with potential coal mining. Whilst these standards may also confer benefits on the community in terms of consumer surplus values associated with environmental outcomes, the opportunity costs and environmental benefits will vary on a case-by-case basis. In some instances, the opportunity costs may be enormous while the benefits are modest or negligible.

Economic principles help to clarify the nature of this trade-off. This economic trade-off analysis is conceptualised in Figure 1 using an hypothetical environmental restriction on coal mining in a defined geographic area. No matter the nature of this environmental restriction, the same principles apply.

In Figure 1, the x-axis refers to an increasing level of a hypothetical environmental restriction in the vicinity of, say, a water body. The y-axis is a dollar value. The marginal cost curve represents the incremental foregone coal producer surplus as the level of the environmental restriction increases. The greater the level of the environmental restriction the greater the marginal cost. Total cost is represented by the area under the marginal cost curve at any level of environmental restriction.

The marginal benefit curve represents the environmental benefits (avoided environmental damage costs) gained from increases in the level of environmental restrictions. The greater the level of environmental restriction, the smaller the marginal benefit (law of diminishing marginal utility). Total benefit is represented by the area under the marginal benefit curve at any level of environmental restriction.

In this framework, the optimal level of an environmental restriction is where the marginal benefit of a restriction equals the marginal cost. This level minimises the two sets of costs, foregone coal production, and unrealised environmental benefits (avoided environmental damage costs). It also maximises net benefits.

The way Figure 1 is drawn indicates that there will be some optimal level of environmental restriction that will be positive. However, it is quite possible, and indeed likely in many instances, for the marginal benefit of an environmental restriction to be lower than the value of foregone coal producer surplus and therefore for the optimal level of environmental restriction to be zero.

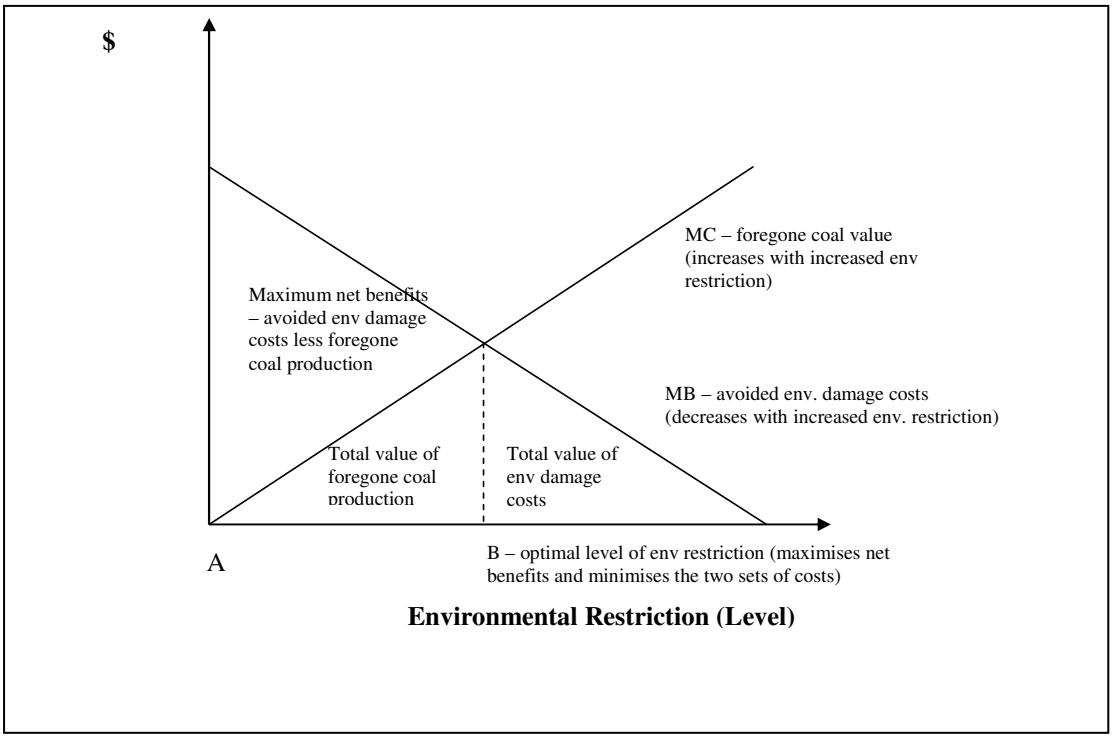

Figure 2 – Trade-off between coal production and environmental damage costs

Implementation of this economic trade-off framework requires estimation of both the marginal cost curve and the marginal benefit curve for the coal mining project under consideration. The marginal cost curve can be estimated from prediction of the coal resource foregone under various levels of an environmental restriction, the price of coal and the costs of extracting the coal, and is dependent on available mining technologies.

Marginal benefit is a non-market value and requires implementation of non-market valuation methods such as Choice Modelling to estimate the extent to which the community value reductions in environmental damage from underground mining.

Where the magnitude of environmental benefits or the resource implications of different environmental restrictions are uncertain it is possible to supplement the trade-off analysis through sensitivity testing or applying probabilities to outcomes i.e. an expected value approach.

From this discussion on the economic trade-off framework, there are several key aspects for consideration by the Panel:

- There is always some trade-off with underground mining between the quantity of coal recovered and environmental damage costs to the community.
- Environmental restrictions impose opportunity costs on society in terms of the value (producer surplus) of coal production foregone but may also provide environmental benefits.
- The optimal level of environmental restriction is where the marginal opportunity costs of foregone coal production are equal to the marginal environmental benefits of the restriction.
- Some level of environmental damage will almost always be optimal in the case of underground mining. Any paradigm that suggests no environmental damage or only minimal environmental damage is acceptable is likely to be economically inefficient.
- The imposition of a single environmental standard for all future mining in Wyong LGA is also likely to be economically inefficient and impose considerable opportunity costs on society.
- The optimal level of environmental restriction will vary from situation to situation. A lesser environmental restriction will be optimal the steeper the marginal cost curve and the smaller the environmental benefits of imposing environmental restrictions. A greater level of environmental restriction will be optimal the flatter the marginal cost curve and in situations where there are greater environmental values are at stake.
- A not uncommon situation is likely to be one where the optimal level of environmental restriction is zero because the environmental benefits of a restriction are small in comparison to the value of foregone coal.
- It should also be noted that in some instances where there is a trade-off between the quantity of coal recovered and environmental damage costs to the community it may be technically feasible to remediate environmental impacts to a point where environmental damage is negligible thus internalising the externality cost of the mining activity and requiring no environmental restriction.

Given the current planning process, each individual project should have the opportunity to be assessed on its individual merits, taking into account the environmental, social and economic costs and benefits particular to the project.

7 - Conclusion and recommendations

The planning approvals process is designed to address particular issues for individual projects on their merit and ensure adequate protection of significant natural features, infrastructure, and public amenity. However, the NSWMC acknowledges that the existing system should be subject to regular review and revised, where necessary, to ensure that it is effective, efficient, and continues to meet changing community expectations.

Based on the above discussion it is recommended that:

- The merits of mining coal in the Wyong LGA be considered on a case-by-case basis where potential environmental impacts can be considered in detail, and measures, such as project design, can be explored to minimise and mitigate impacts.
- The approval process for consideration of future mining proposals explicitly consider the trade-off between the economic and social benefits to the community and any environmental impacts including the likely impacts on water, of subsidence and on amenity. This need not go as far as placing economic values on environmental impacts, but should compare the different environmental outcomes achieved against the economic impact of various environmental restrictions.
- Environmental standards/restrictions for future coal mining also be considered on a case-by-case basis to enable the economic trade-off between environmental benefits of a standard/restriction and the opportunity costs of foregone coal production to be considered.
- Any future coal mining in the Wyong LGA should aim to maximise community benefits through:
  - Undertaking an effective Social Impact Assessment. Industry and government should work together to understand best practice approaches to Social Impact Assessment.
  - The inclusion of local councils in decisions affecting the local community.
  - Contributions to community infrastructure, groups and activities.
  - Local employment and purchasing policies.

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Appendix 1: Relevant NSW Government Strategic and Regulatory Planning Policies

The strategic planning instruments below recognise the value of NSW non-renewable minerals and other extractive resource wealth. The instruments facilitate the responsible and orderly extraction and processing of these resources (which include coal) following adequate assessment and consideration of environmental and other impacts.

SEPP (Mining)

State Environmental Planning Policy (SEPP) *(Mining, Petroleum Production and Extractive Industries) 2007* (SEPP Mining) was gazetted on 16 February 2007 and aims to provide for the proper management and development of mining, petroleum production and extractive material resources; to facilitate the orderly use and development of areas where the resources are located; and to establish appropriate planning controls to encourage sustainable management of these resources.

The SEPP introduces additional provisions to ensure that potential environmental and social impacts are adequately addressed during the assessment and determination of development proposals. The SEPP also requires issues such as the potential conflict between mining and other nearby industries such as farming, protecting sensitive areas, water resources, transport, rehabilitation and greenhouse gas impacts are considered in development proposals.

Under the SEPP (Mining) open cut or underground mining on any land is permissible with development consent. Facilities for the processing or transportation of minerals are permissible with development consent on land on which mining may be carried out (with or without development consent) if the minerals were mined from that land or adjoining land.

Draft Central Coast Regional Strategy

The Draft Central Coast Regional Strategy (CCRS) prepared by the Department of Planning (DoP) (dated 2006) aims to promote careful planning for future population growth within the Wyong LGA while recognising that future development patterns must be well managed to protect the environmental assets of the area. The key objectives of the CCRS include: utilising the full capability of existing infrastructure, improving employment and providing a variety of local jobs.

Specifically, the CCRS aims to promote and preserve environmental qualities of the region by the following actions:

- Undertake mapping of regionally significant activities (including agriculture, mining and extractive industry) to identify resource lands for preservation;
- To ensure future development in Wyong LGA takes account of current and potential future mining issues; and
- To appropriately zone land in the LEP with high State or regional resource values.

Central Coast Catchment Blueprint

The Central Coast Catchment Blue Print (CCCBP) (also known as the 'Integrated Catchment Management Plan for the Central Coast Catchment 2002') has been developed by the Central Coast Catchment Management Board (CCCMB) to provide a framework for the strategic direction of investment in catchment management. The major catchments to which the CCCBP pertains are those associated with Lake Macquarie, Tuggerah Lakes and Brisbane Waters.

The objectives of the CCCBP include maintaining the health of aquatic ecosystems and land capability by reducing soil degradation/erosion, increasing native vegetation and terrestrial biodiversity (CCCMB, 2002).

Hunter & Central Coast Regional Environmental Management Strategy

The Hunter and Central Coast Regional Environmental Management Strategy (HCCREMS) dated 2004 is a regional initiative implemented through the collaborative efforts of 14 Councils in the Hunter, Central and Lower North Coast of NSW. HCCREMS seeks to facilitate a regional approach to

ecologically sustainable development by actively encouraging greater co-operation between member Councils, State and Federal authorities, industry and community groups (HCCREMS 2004).

HCCREMS has become widely regarded as a model approach to integrating local government planning and environmental management at the regional level. The key objectives of HCCREMS are to:

- Provide a framework for co-ordinated action in relation to environmental management issues impacting on the region;
- Address those environmental and natural resource issues that are best managed at a regional scale (e.g. biodiversity conservation and water quality management); and
- Facilitate regional partnerships and resource sharing to address key environmental management issues in a co-ordinated, pro-active and efficient manner (HCCREMS 2004).

Wyong Local Environment Plan 1991

The Wyong Local Environmental Plan 1991 (LEP) aims to promote the development, conservation and economic use of resources in the Wyong LGA and to facilitate and encourage ecological, economic and social sustainability.

Specifically, the LEP provides the following objectives:

- Facilitate employment generating development which will contribute to the economic and social growth of the Shire of Wyong;
- Restrict development within flood prone areas in order to minimise flood damage and obstruction to flood water; and
- Ensure that development and land management practices do not adversely effect water catchments, water quality and important eco-systems such as streams, estuaries and wetlands.

The NSW regulatory system process mandates a detailed and transparent planning and environmental approval process for open cut and underground coal mines in NSW. This process includes obtaining key approvals under relevant legislation and demonstrating a commitment to environmentally responsible mining. The key stages of the process include the following:

- Exploration through an Exploration Lease (EL) issued under the *Mining Act 1992* (Mining Act);
- Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation);
- Mining Tenements issued under the Mining Act;
- Mine Operations Plans (MOP) and Subsidence Management Plan (SMP) approval issued under the Mining Act;
- Environment Protection Licence (EPL) issued under the *Protection of the Environment Operations Act 1997* (POEO Act);
- Surface and groundwater licences issued under the *Water Act 1912* (Water Act) and the *Water Management Act 2000* (Water Management Act);
- Environmental Management Strategy & System, Management Plans, Monitoring Programs and Procedures (as specified in the above legislative requirements); and
- Independent Regulatory Compliance Auditing.

The main stages relevant to this inquiry are summarised below.

Exploration

Under the Mining Act, an EL must be obtained before any prospecting of a public mineral (including coal) may be conducted (section 5 of the Mining Act).

The EL approval process requires the demonstration of financial and technical resources, a security bond for rehabilitation, the reservation of a two-year budget for the required exploration activities and the annual on the progress of exploration. A land access agreement is required to be implemented with any private landholder prior to the commencement of exploration activities.

Project Approval

The SEPP (Major Projects) gazetted on the 25 May 2005 declares that all coal mining development falls under Part 3A of the EP&A Act. Any application for a Part 3A approval is required to be accompanied by an Environmental Assessment (EA).

The EA is required to assess all anticipated environmental impacts and the proposed mitigation and management measures to minimise any adverse impacts. Mitigation and management measures are developed in consultation with regulatory and community stakeholders. An Independent Hearing Assessment Panel (IHAP) may be called to review the EA, hold further stakeholder consultation and suggest additional conditions of Project Approval.

The conditions in the Project Approval are intended to ensure that the mine will be managed in an environmentally responsible and accountable manner and that the site is successfully rehabilitated upon mine closure. A ML is granted under the Mining Act once a Project has been approved.

The Minister for Planning also has the power under Section 94 of the EP&A Act to impose a condition of Project Approval requiring the payment of a monetary contribution to the relevant local council/s. The quantum of Section 94 contributions is determined based on consideration of the cost of providing additional services for increased demand on local community services due to the mine. Section 93F of the EP&A Act enables a Voluntary Planning Agreement (VPA) to be established with the proponent and the local council which provides a mutually agreed contribution to the local community, in lieu of Section 94 contributions.

Mining Operation Plans

In accordance with Section 73G of the Mining Act, a detailed MOP must be prepared and approved by the DPI prior to the commencement of any mining operations. The MOP is then required to be reviewed at least each seven years. The MOP requires mines to actively consider environmental and rehabilitation outcomes and to provide management systems to integrate these outcomes with mine planning and production.

Subsidence Management Plans

A SMP is required to be prepared by the proponent and approved by DPI wherever underground mining will potentially lead to subsidence (defined as greater than 20 mm deformation of the natural surface). The essential purpose of the SMP is to provide for the adequate protection of significant natural and built features.

A SMP is required to describe the area that may be affected; the process of subsidence prediction employed; the prediction and assessment of subsidence impacts on the area affected; the consultation process undertaken with government agencies and the community; the results of such consultation; and the proponent's management techniques to prevent, mitigate or rehabilitate subsidence impacts.

A key component of the SMP is the preparation of Property Subsidence Management Plans (PSMP) for each individual property within the SMP application area. The PSMPs include a description of subsidence impacts and management measures for all property features, including man-made improvements, significant natural features and land use/business use. The PSMPs are developed in consultation with individual landowners and Mine Subsidence Board (MSB).

Where major surface infrastructure (such as dams and water supply infrastructure) are located within the SMP application zone, then an Infrastructure Risk Management Plan (IRMP) is also required to be prepared in consultation with the infrastructure owner. The IMP details the predicted subsidence impacts on the infrastructure and the management techniques to be implemented in order to prevent any adverse impacts on the infrastructure.

A SMP is only granted approved by the DPI after detailed consideration of all potential impacts on landholders and the environment. If any potential impacts presented in the SMP are deemed significant or unacceptable, particularly with regards to adjacent rivers or water supplies, then the SMP will either be modified or refused (DPI, 2006).

A SMP is first considered by an internal DPI review committee which assesses the technical merits and adequacy of the SMP. This committee may refer the SMP to the Interagency Committee (comprising senior representatives from a variety of government agencies, such as the Department of Environment and Climate Change (DECC)) for review and recommendation.

Pre-mining baseline monitoring is required as part of a SMP. If a SMP is approved, a detailed and ongoing Subsidence Monitoring and Reporting Program is required to be undertaken to the satisfaction of the Director General of DPI. The Monitoring Program would compare predicted subsidence impacts with actual impacts on both built structures, natural features and ecological values, and shall include monitoring of surface and groundwater levels and quality. Summary results and analysis of the monitoring data must also be reported to DPI on a regular basis and provided to all other government agencies with an identified interest.

Environmental Protection Licences

All mining is listed as a "*scheduled activity*" under Schedule 1 of the POEO Act. The owner or operator of a scheduled activity is required to hold an EPL and comply with the conditions of the licence. Project Approval is a necessary prerequisite to the granting of an EPL. The EPL authorises the conduct of the scheduled activity in accordance with the Project Approval and also enables DECC to issue prosecute the licence holder for non-compliances with EPL conditions.

Water Licences

The Wyong LGA is subject to three Water Sharing Plans for the Jilliby Creek Water Source, Ourimbah Water Source and Kulnura Mangrove Mountain Groundwater Sources as established under the Water Management Act. The Water Sharing Plans outline water sharing rules for the allocation of water and require that Water Access Licences are obtained for all water users.

Subsequently, water can only be drawn from aquifers and streams in accordance with a Water Access Licence issued under the provisions of the Water Sharing Plans and Water Management Act. Public advertisement of the application for a Water Access Licence and a Public hearing may also be required as part of the process for the determination of a Water Access Licence application.