1. New South Wales

1.1 New South Wales environmental assessment process

There are three approval streams under the *Environmental Planning and Assessment Act 1979* for major developments in NSW and these are regulated by Parts 3A, 4 and 5 of the Act. Environmental assessment for mining projects can occur either through Part 3A (major projects) or Part 4 (other projects) depending on the scale and location of the project. In practice most mining projects will be under 'major projects', where ministerial approval is required.

Under Part 3A of the Act, developments deemed to be 'major developments require approval by the Minister for Planning. There is no prescribed process for environmental impact assessment under Part 3A of the EPA Act. The requirements for environmental assessment of major developments are detailed in the Director General's requirements which are developed individually for each project assessed under Part 3A. The Minister for Planning is tasked with approving major projects and the Director General provides a Statement of Compliance that all steps in the assessment process have been followed.

If a development does not meet the criteria of a 'major development' under Part 3A, it may be assessed under Part 4 or Part 5 of the EPA Act.

Projects that do not require consent under Part 4 and do not meet the criteria to be assessed under Part 3A are assessed under Part 5 of the EPA Act. Part 5 assessment is required when a developer intends to develop a project that requires approval from a government agency (called a determining authority). Such approvals include licences under the NSW water management legislation. An EIS is required under Part 5 if the determining authority decides that an activity is likely to significantly affect the environment, critical habitat, or threatened species, populations, or ecological communities, or their habitats. All coal mine projects are assessed as major projects.

1.2 New South Wales water management and planning process

In NSW, approximately 80 percent of water extracted is managed through Water Sharing Plans (WSP) under the Water Management Act 2000. The remaining water resources will continue to be managed under the Water Act 1912 until WSPs under the Water Management Act are completed. Generally the WSP deal with surface and groundwater separately but a few are combined surface and groundwater plans. Currently there are 12 WSP specific to groundwater and the remaining areas will be covered by macro water plans. These are administered by the NSW Office of Water.

For each water source they cover, WSPs assigned a portion of recharge to the environment, set a long term average extraction limit, established rules for sharing water, allowed for local restrictions on pumping to be set at certain times to maintain water levels, assigned distance limits between production bores and between new extraction bores and groundwater-dependent ecosystems, and set rules for water trading. The six WSPs operating under the

Water Management Act 2000 for major inland groundwater systems also include a process for reducing the total entitlements to sustainable extraction limits over the ten years of the plan. To assist licence holders in adjusting to reduced entitlements in these systems, a program of financial assistance known as Achieving Sustainable Groundwater Entitlements Program is being implemented.

Macro water plans are currently being prepared for unregulated rivers and groundwater and will include several groundwater plans. Macro water plans are WSPs that cover a number of rivers or groundwater systems and generally apply to catchments where there is less intensive water use. These areas account for most of the remaining 20 per cent of water use not already managed by existing WSP.

There is a water market established in NSW whereby water users can purchase relevant water licences to meet their demands. For most new commercial purposes in NSW, water trading remains the only way that water can now be obtained as, in most areas of the State; available water is fully allocated (DWE 2009). Entry into the water market can only be done in accordance with the provisions of the Water Management Act 2000 and the Water Act 1912. The mining industry, as with all water users, is able to purchase water entitlements through permanent or temporary transfer of water licences. The purchase and transfer of licences can occur under both the Water Act 1912 and Water Management Act 2000 and applies to both surface and groundwater resources.

Mining does not have a higher security than other water users. Higher priority is only provided under the Water Management Act and WSPs for purposes such as the environment, basic landholder rights, Major Water Utilities (Major Water Supply and Electricity Generation) and town water supply.

The Office of Water is currently drafting an Aquifer Interference Guideline with a long term view to having this policy incorporated into the NSW Department of Planning assessment for major projects. Under this policy, subsidence impacts arising from aquifer interference (e.g. longwall mining and groundwater pumping) will be addressed, the quantity of water interfered with will be accounted for as well as incidental water' such as mine inflows. Implementation of this policy will result in consistency for groundwater accounting across all regions and how it is applied to all operations/users.

1.3 Jurisdictional Inclusion of NWI objectives

The NSW NWI State Implementation Plan was accredited by the NWC in 2006 and the following presents a summary of key actions of the Implementation Plan.

The NSW Water Management Act 2000 is very closely aligned with the NWI objectives. DWE planning and policies are consistent with the NWI principles and a report has been prepared that outlines how NSW is working towards achieving the NWI objectives. The Water Management Act 2000 has been amended and incorporates parts of the NWI framework and principles. The amendments made to date have been aimed at achieving consistency between Acts and further amendments specifically aimed at mining projects and related issues will be made in the future.

To ensure that the principles and objectives of the Water Management Act 2000 are implemented the former Department of Land and Water Conservation (DLWC) prepared the NSW State Groundwater Dependent Ecosystems (GDE) Policy 2002 which sets out a

process by which the water management plans are prepared. The GDE policy is implemented under the WSP and applies the policy principles at a local level, identifies and classifies groundwater dependent ecosystems, includes rules for bores and other works (such as setback distance) and to protect GDE's from water extraction impacts.

In line with returning all currently over-allocated or overused systems to environmentally-sustainable levels of abstraction, NSW is working towards reducing the total entitlements in any over-committed groundwater system, through the water sharing plans, to targeted sustainable yield levels. This objective has not been fully achieved for some systems in NSW, particularly the major inland alluvial aquifers – the Upper and Lower Namoi, Lower Gwydir, Lower Macquarie, Lower Lachlan, Lower Murrumbidgee and Lower Murray groundwater systems. For NSW achieving this objective for the return to a sustainable yield is a long term process that will be undertaken over several years.

To ensure a consistent approach is achieved in the implementation of NWI objectives, NSW has established an operational relationship with the Queensland DERM to deal with issues particular to the NSW-Queensland Border Rivers system. However, this is an exception rather than the rule, as there are no cross jurisdictional agreements in relation to mining in place.

1.4 Performance Indicators

The NSW NWI Implementation Plan sets out the actions that NSW has already completed and provides detailed information, for each NWI action, on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

An extract from this plan details the method used by NSW to monitor progress against performance indicators:

> "NSW will monitor its progress in water reform with reference to key performance indicators developed by the national Natural Resource Management Ministerial Council (NRMMC)".
>
> "A second source for performance indicators specific to NSW's activities will be the NSW Natural Resources Commission (NRC), the independent statutory body responsible for providing advice and making recommendations to Government on major policy actions related to environmental and natural resource management. The NRC has already established a strong record of public consultation and offering meaningful and clear state-wide standards and targets". (NSW NWI Implementation Plan, 2006)

1.5 Jurisdictional Planning Compliance with NWI Objectives

NWI objectives and principles are considered as part of the environmental assessment process for proposals, including transparent statutory-based water planning, market allocation and entitlements, water accounting and connectivity.

The NSW planning and environmental assessment policies and processes are essentially compliant with all the NWI objectives in that they are working towards the NWI objectives with clear actions and targets in place for achieving each of them. However, questions

raised by the NSW Government and other jurisdictions such as "What constitutes compliance?" and "How will we know we are achieving compliance?" highlight some uncertainties.

In terms of achieving compliance with the NWI objective to achieve '...a regulatory and planning based system of managing surface and groundwater resources' the NSW Government considers that attaining consistency across inter-agency legislation and processes (such as between planning, mining, environmental and water legislation) is fundamental.

As summarised in Section 5.3, NSW is working towards achieving the NWI objectives and significant progress has been achieved to date.

1.6 Consideration of groundwater and surface water interaction

Surface water and groundwater interaction is an important consideration in the development of WSPs. NSW Office of Water employs a risk based approach to the issue of groundwater and surface water interaction that is used to assess projects on a case by case basis, especially for systems showing high and medium connectivity. The tools used by the Office of Water to assess the interaction of groundwater and surface water and connectivity effects are currently being revised and updated.

The NSW Groundwater Protection Policy (DLWC, 1998) and the NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002) provide a framework for an integrated approach where groundwater issues must be considered in relation to surface water management, including groundwater quality, quantity and dependent ecosystems as well as the potential for impacts of groundwater on surface water systems.

The Office of Water developed a policy guideline for the Hunter Valley region in 1996 and the issue of impacts on groundwater and surface water from mining was assessed and detailed in this report. This policy is currently being further developed and expanded to incorporate the Water Strategy Framework to protect and enhance both groundwater and surface water systems.

1.7 Assessing the availability and condition of groundwater

WSPs set the rules that are reflected in conditions on both licences and approvals issued under the WMA for the water resources they cover. At the planning stage the Proponent collects groundwater data (usually at a local scale and specific to their mining activities) and, as part of their assessment, The Office of Water considers this in the context of the entire water resource system and all potential impacts. In some regions there is limited available information or data for a groundwater system and, where this is the case, additional conditions for monitoring and reporting may be required of the Proponent.

The Office of Water has extensive knowledge on the basal aquifers in NSW and this information forms the basis for the WSP. With an improved understanding of the limits and capacity of groundwater resources, the Office of Water are now able to accurately assess cumulative effects on a regional scale and set realistic abstraction limits for a system.

1.8 Assessing cumulative effects in the planning process

The majority of mining projects in NSW fall under the category of 'major projects', and are therefore assessed under Part 3A of the Environmental Planning and Assessment Act 1979. As part of a detailed environmental impact assessment process the Director General's requirements are developed individually for each project to be assessed under Part 3A.

A review of the Director General's requirements for several coal mines assessed under Part 3A revealed that cumulative impacts of these projects on a range of environmental aspects, including surface and groundwater, are customarily included as a requirement for environmental impact assessment. These impacts are assessed on a scale of the mining project under assessment and all neighbouring mining projects.

In the assessment of mining projects the Department of Planning usually requires that groundwater impacts are modelled in detail, such as through using 3D modelling technology and all available regional data. Particular attention is given to potential drawdown from surface water sources and alluvial aquifers. Coal seam aquifers (which are dewatered as part of the coal extraction process) are usually saline and generally have no other beneficial use. The key water management issue associated with dewatering of a coal seam aquifer is the management, reuse or disposal of the saline water.

1.9 Data collection and reporting

As a condition of approval for new projects, annual water consumption data must be reported to the Office of Water as well as details of water budget, updated water balance modelling, updated mitigation measures etc. For some heavily used regions, such as the Hunter Valley, there is an excess of information which is difficult for the Office of Water to manage or utilise for modelling in a timely fashion, due largely to the overload and resource requirements to process the data. Mining companies are required to collect, interpret and model the data and then provide a report demonstrating compliance based on the data.

Monitoring programs are carried out by the Office of Water in some regions. In regions where monitoring is undertaken by private entities resultant data may also be publically available.

2. Queensland

2.1 Queensland environmental assessment process

In Queensland there are three pieces of legislation that govern environmental assessment: the State Development and Public Works Organisation Act 1971 (SDPWO Act) (for 'significant projects'), the Integrated Planning Act 1997 (not applicable to mining environmental assessment) and the Environmental Protection Act (EP Act) 1994 (relevant to mining activities).

A mining project can be assessed under the SDPWO through the Co-ordinator General under the Department of Planning and Infrastructure, if declared a 'significant' development or as a standard process under the EP Act. There are two different levels of assessment for mining projects according to size, complexity and location, that, when combined, reflect the potential environmental risk of the project. Level 2 is a simplified environmental assessment process which does not require public consultation, whereas Level 1 requires public notification and may require consultation through an EIS.

The Coordinator General (or designated Assessment Manager) is the approving authority under the SDPWO Act and under the EP Act the Department of Infrastructure and Planning is the approving authority.

2.2 Queensland water management and planning process

The majority of Queensland's groundwater resources are administered by the Department of Environment and Resource Management (DERM) under the Water Act 2000. A Water Resource Plan (WRP) is developed for each catchment which assesses the size and nature of the resource to enable sustainable water allocation and management. WRP include both surface and groundwater systems. The Queensland Water Act 2000 also establishes a process by which existing entitlements to water are converted to "water allocations" and are tradable.

Water Resource Plans are implemented through a corresponding Resource Operations Plan (ROP) which ensures that the environmental and consumptive objectives detailed in the WRP are achieved through establishing guidelines for water trading and water use. There are currently 21 such plans in operation, covering more than 90 per cent of the State's water catchment areas. These are being amended (or have been amended) to incorporate groundwater resource management and this process has been completed for the Pioneer Valley, the Burnett and the Barron Plan areas.

Groundwater in Queensland is managed through the establishment of groundwater management areas under a WRP or other regulation under the Water Act, with additional management measures set out under the Wild Rivers Declaration in some instances. Queensland has declared Groundwater Management Units (GMUs) which have specific groundwater management plans covering groundwater abstraction, allocation and use. GMU's outside of a WRP are administered via water licensing.

GMUs fall into either the sub-artesian or artesian category and may overlap. Sub-artesian GMUs have been defined in accordance with current management practices applied by the DERM. Artesian GMUs have been defined into hydrologic zones in accordance with the guidelines set by the Great Artesian Basin Water Resources Plan.

2.3 Jurisdictional Inclusion of NWI objectives

According to the Queensland NWI State Implementation Plan, significant steps have been taken to implement the 1994 COAG water reform framework. The Queensland Government is implementing a water accounting project that will create an integrated water management system for the State. Ninety percent of Queensland is currently covered by water resource planning activities with the finalisation of fourteen water resource plans, five resource operations plans and further plans in the draft stage.

Introduction of the Water Act 2000 provided Queensland with the legislative framework to deliver improved water planning, allocation, management and supply processes and to ensure improved security for water resources. A core purpose of the Water Act in regard to water allocation and management is ensuring sustainable resource access and a critical element of the legislation involves management of the catchment water balance through consideration of all its components, including environmental flow needs, in a single catchment based WRP.

Amendments have been made to the Water Act and ongoing efforts are made to ensure that policies currently under development are also consistent with NWI objectives. Water Resource Plans (WRP) are required under the Water Act and these have been developed in line with NWI objectives. This is Queensland's key legislative mechanism for implementing the NWI principles.

The Queensland Department of Environment and Resource Management's (DERM) (formerly the Environmental Protection Agency and Department of Natural Resources and Water) application of the NWI objectives is through the environmental assessment process on a case by case basis with groundwater issues specifically managed through DERM. This process takes account of what is already occurring at a location through a regional assessment of the existing environment. This includes an assessment of existing groundwater resources, current impacts on groundwater and potential impacts from the proposal. Cumulative effects are considered through this process.

The Queensland Government acknowledges the desirability of nationally compatible characteristics for secure water access entitlements but states that, at this stage, there will be no amendment to the current legislative framework to provide for such commonality.

The Queensland National Water Initiative State Implementation Plan January 2006 was accredited by the NWC and a new plan is currently being drafted. Queensland has an Implementation Plan prepared for each of the NWI key actions.

2.4 Performance Indicators

Queensland's National Water Initiative State Implementation Plan (2006) outlines the key actions and implementation dates for achieving NWI objectives. Several of these key actions relate to performance indicators set out in the National Water Commission NWI Performance Indicator Set, and a description of deliverables and progress to date is provided. Compliance

with the NWI requirements is assessed as part of annual reporting to the NRMMC and COAG (p142 QLD IP).

Performance indicators for Environmental Flow Objectives (EFO) and Water Allocation Security Objectives (WASO) are included in some WRP's. For example, the Boyne River WRP uses performance indicators generated from a simulation of flows over an extended period of time for EFO's. The monthly reliability of supply of water is used as a WASO performance indicator.

Some of the larger catchments that are exposed to a greater intensity of water use, including the Great Artesian Basin, do not have quantitative performance indicators set. Sustainable water use in these catchments is managed through a risk based system that prevents the increase of average volumes of water taken from the area to which the plan applies.

2.5 Jurisdictional Compliance with NWI objectives

The Queensland planning and environmental assessment policies and processes are compliant with the majority of NWI objectives. However, variation exists in the areas of the assignment of risk, the creation of a common lexicon, and the determination of sustainable yields.

The risk assignment framework for changes in allocation is detailed in Part 3 of the Water Act. Under this legislation, compensation is "payable to the entitlement holder if a change reduces the value of the entitlement, and the change is made within 10 years after the Water Resource Plan is approved". The assignment of risk under the Water Act is dependent on the timing of any change in allocation to an entitlement holder: This framework is not consistent with the NWI risk assignment framework, in which the entitlement holder is only liable for the first 3 per cent of any water reduction, with the remainder shared between the Commonwealth and the State. Future amendments to the Water Act to incorporate the NWI risk framework have a proposed commencement date of 2014.

Queensland's Implementation Plan states that legislation will not be amended to achieve the desired common terminology detailed in the NWI and any amendments to Queensland legislation will only be completed on a case by case basis. This may be considered to be inconsistent with the NWI objective for clear and nationally-compatible characteristics for secure water access entitlements:

> "Queensland already has in place legislation which defines water licences, interim water allocations, and water allocations. The public has been educated on this terminology. The disruption that would be caused by changing terminology at this time would far outweigh any benefits."

Over allocation of catchments is determined on a risk basis by:

> "estimating the risk to the State's groundwater resources involves ranking the groundwater systems according to their level of allocation compared with recharge, vulnerability to threats such as seawater intrusion, rising water tables, threats to groundwater dependent ecosystems and local issues such as local pumping effects, development pressures or community conflicts"

This risk based method does not include any quantification of the levels of sustainable yield, therefore it is not possible to determine if catchments in Queensland are over allocated. As a result, it is not possible to assess whether water use is 'sustainable' for any catchment as required by the NWI.

2.6 Consideration of groundwater and surface water interaction

WRP are the mechanism for assessing environmental flow requirements in relation to both surface water and groundwater systems. Whilst WRPs have initially focused on surface water, key plans are now slowly being, or have been, amended to include groundwater, for example the Burnett and Pioneer WRPs. Queensland is currently commissioning a study to assess the risk of groundwater allocation impacting on surface water flow and surface water entitlements across the State. The outcomes of this study will then influence future WRP prioritisation and necessary amendments to existing WRPs to avoid any double accounting occurring.

As mentioned above, consideration is given to the connectivity between groundwater and surface water under the WRP. In terms of assessing the ongoing impacts and interactions of groundwater and surface water, both are now administered through the recently formed DERM.

2.7 Assessing the availability and condition of groundwater

At the planning stage, DERM requires that a mining Proponent carry out a groundwater investigation to assess the impacts of the project on groundwater. This would include collecting and assessing groundwater data (usually at a local scale and specific to their mining activities). As part of their assessment DERM considered this in the context of the entire water resource system and all potential impacts.

Any direct or indirect (e.g. dewatering) take of groundwater from an aquifer in an area where water is managed will require an authority to take water and the conditions or approvals of the authority are dependent upon either the relevant WRP or declared groundwater area policy rules. Approvals are issued with conditions that require monitoring, reporting, assessment and mitigation of the effects of the take where appropriate.

2.8 Assessing cumulative effects in the planning process

In Queensland cumulative effects are considered at the start of a project proposal. However, in the past, assessments of groundwater in mining project EAs have been quite limited. Proponents are now required, in preparing EAs to assess cumulative effects for all aspects of their mining project. How much detail and depth required for the environmental assessment is not specified. At present cumulative effects typically forms a small section of an EA, briefly highlighting a broad range of cumulative effects ranging from socio-economic, cultural, noise, air and other aspects of the project.

The environmental assessment must detail the impacts of the project in conjunction with the development of other proposals and information on the cumulative effects of all aspects of the Project, including water. These impacts are usually only assessed at a local scale by the Proponent due to lack of historical data and access to groundwater data from other companies. The administering authority (typically DERM) makes further assessment of the potential impacts at a regional scale by assessing water resource usage of multiple mines and other users.

Where necessary, Water Resources Operation Plans (WROP) are employed under the Water Act to set out how the WRP will be implemented, including monitoring requirements. WROP are developed for a specific catchment and guides how water use will be managed within the catchment, and can be revised to include a new project's impacts on the water resources of the catchment, e.g. in the Fitzroy WROP.

2.9 Data collection and reporting

Under the Environmental Authority conditions for a mining lease Proponents collect and report data on (for example) water quantity and quality, drillhole logging data, hydro maps and modelling to DERM. DERM stores, reviews and manages this information to build up a database for a region. This information is also collated and reported to other agencies such as the Bureau of Meteorology. DERM carries out independent monitoring and this information may also be provided to Proponents to assist in developing groundwater models of a region.

Where relevant to validate models or to monitor for contamination, DERM requires groundwater quality information to be collected by mining companies under their environmental authority. However, the actual groundwater quality monitoring data collected by companies are generally retained by the companies and made available to DERM during audits or investigations relating to a spill or complaint. DERM does not carry out groundwater monitoring activities.

3. South Australia

3.1 South Australian environmental assessment process

SA has two processes by which mining approvals can be obtained: the Mining Act 1971 (Mining and Rehabilitation Management Plan) process for standard projects and the Development Act 1993 (EIS process) for projects of major social, economic or environmental significance.

Primary Industries and Resources South Australia (PIRSA) is the main statutory body responsible for authorisation of mining in South Australia under the Mining Act 1971. Activities assessed under the Mining Act 1971 are not considered as a 'Development' under the Development Act 1993, and do not require separate planning assessment and approval.

Under Section 46 of the Development Act 1993, the Minister for Urban Development and Planning can declare a proposed development a 'Major Development' if the development is deemed appropriate or necessary for assessment of an EIS and where the proposal is considered to be of major economic, social or environmental importance. BHP Billiton's Olympic Dam Expansion Project is an example project deemed to be a 'Major Development' in South Australia, triggering a State-run assessment process with opportunity for public comment before any decision is made on whether the proposal warrants approval. Once a proposal has been declared a major development proposal by the Minister and the Development Application received, the Application is referred to the Development Application Commission (DAC).

The three possible levels of detailed assessment which may be required by DAC are:

- An Environmental Impact Statement (EIS), which is required for the most complex major proposals and requires in depth investigation.
- A Public Environmental Report (PER), which may be referred to as a targeted EIS. This applies where the issues surrounding the proposal require investigation in depth but are narrower in scope and there is existing information available.
- A Development Report (DR), which is the least complex level of assessment, and principally relies on existing information.

3.2 South Australian water management and planning process

The Department of Water, Land and Biodiversity Conservation (DWLBC) is the statutory authority that manages SA's water resources. Water access and use is licensed in prescribed areas. In areas where water resources are not prescribed, there is no limit to the volume of surface water of groundwater that can be taken, providing adverse impacts on existing users will not arise. Water Allocation Plans (WAP) deal with both surface and groundwater allocations and the Natural Resources Management Act 2004 aims to facilitate

integrated management of all water resource systems within a natural resource management framework.

In its 59 water management areas, SA has 15 approved management plans, one draft management plan and 11 further plans in progress. Twelve areas are managed by State-wide policy, 20 by regional area plans, and 27 by area management plans.

In terms of water allocations, water use by mining operations is recognised as a use in SA that can be allocated water and access is granted in the same manner as any other user through a licensing process. However, there are no whole of basin allocations specifically reserved for mining purposes, hence if a basin is fully allocated, a mining company would need to purchase water to gain water access.

3.3 Jurisdictional inclusion of NWI objectives

In 2004 the South Australian Government enacted the Natural Resources Management Act 2004. The Act enables various natural resources to be managed conjunctively and combines functions of three earlier pieces of legislation – the Water Resource Act 1997, Soil Conservation and Land Care Act 1989 and the Animal and Plant Control (Agriculture and Other Purposes) Act 1986.

The State Natural Resources Management Plan (NRM Plan) sets the overall strategic direction for the management of all water resources in the State and addresses holistic management and integration with other natural resources. The responsibility for developing Regional Natural Resources Management Plans, including detailed WAP that define consumptive/non-consumptive water balances for each catchment, is delegated to the Natural Resources Management Boards. The plans are developed using hydrologic and hydrogeological models based on historical, current and predictive data. WAP for prescribed water resources are designed to address all aspects of resource management at the catchment level and set out the criteria for determining water access entitlements in line with appropriate site use and trade conditions with the focus on sustainability. The Far North WAP, which is used to administer the groundwater resources generally coinciding with the limits of the Great Artesian Basin (GAB) in South Australia and associated groundwater systems does not assign a tradable right to mining-related water allocations. Plans are reviewed at least once every 5 years.

South Australia has a NWI Implementation Plan 2005 that is accredited by the NWC. The Plan is supported by the institutional structures and statutory framework to achieve the outcomes of the NWI.

3.4 Performance Indicators

The SA NWI Implementation Plan sets out the actions that SA has already completed and provides detailed information for each NWI action on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

At the time of publication, the South Australian NWI Implementation Plan employed performance indicators developed at the State level.

3.5 Jurisdictional Compliance with NWI Objectives

The South Australian planning and environmental assessment policies and processes are compliant with the majority of NWI objectives. However, variation exists in the assignment of risk arising from future changes in the availability of water for the consumptive pool.

In relation to the assignment of risk in terms of water availability, the Natural Resources Management (NRM) Act "provides that the Minister may reduce allocations where necessary to protect the sustainability of the resource and/or water dependent ecosystems. This includes taking account of climate change and periodic events. Compensation is not payable to holders of water entitlements." This is inconsistent with the risk framework set out in the NWI, and as such, the South Australian legislation is inconsistent with this requirement.

In relation to over allocated systems, the NRM Act includes provisions to return these systems to sustainable levels of extraction through five yearly reviews incorporating extensive community consultation and the amendment of WAPs. This has been successfully achieved in the McLaren Vale region.

The South Australian planning and assessment framework is compliant with the remainder of the NWI Objectives.

3.6 Consideration of groundwater and surface water interaction

The NRM Act 2004 provides a mechanism to manage significant interception of water by regulations and/or by water affecting activity permits.

The impact of dams on the water cycle is already considered in the preparation of NRM plans, including WAP for prescribed watercourses and surface water resources. The plans manage these activities throguh provision of a Water Affecting Activity permit or the activities are managed through a Development Approval, with control provisions from water resource managers if usage is above the designated threshold. Likewise, the impact of groundwater production wells on neighbouring water users (particularly stock and domestic), water dependent ecosystems and other water resources is considered in respect to Prescribed Wells and Water Resource Areas.

SA has limited areas of groundwater and surface water interaction, but the GAB springs of the Far North, wetlands of the South East, the Clare Valley and Mt Lofty Ranges are obvious exceptions, PIRSA encourage mining Proponents to consult with the DWLBC early in the mine planning process to identify water related issues associated with the proposed development prior to the issue of a mining lease. A mining development must have a licensed water allocation issued under the relevant WAP in order to access the entitlement.

DWLBC provides advice to Proponents in relation to the technical assessments required and the range of options and water management regimes that may be considered in preparation of a mine lease proposal or MARP. Particular issues that are primary concerns in relation to mining proposals include groundwater and surface water interaction, potential pollution from acid rock drainage (for example) and groundwater recharge areas that may be affected by mine dewatering. Along with DWLBC the NRM Boards provide information and input into the development of SA's WAP.

Where there are no WAP governing the areas where mining developments are proposed, the Proponent is required to apply for permits to access water resources.

3.7 Assessing the availability and condition of groundwater

The SA mining approvals process, which includes the Mining Act (MARP) process for standard projects and the Development Act (EIS process) for projects of major social, economic or environmental significance, requires that the availability and condition of groundwater be assessed. Whilst there is primarily a two stage authorisation process for mining in South Australia (Mineral Lease Proposal and MARP), groundwater issues are dealt with in the same manner in each of the processes. PIRSA applies a standard risk based approach for all impacts of the proposed development which includes identifying the value of the groundwater resource and assessing whether the resource will be affected by the mining operation. Proponents are required to undertake a full water balance for every new mine site to determine to what extent development will impact the identified/associated environmental values associated with groundwater.

The State also assesses the availability and condition of groundwater to assist in formulating and revising WAP, which are reviewed every five years. Changes in the number of water users and the types of water users are to be considered during the WAP review process.

3.8 Assessing cumulative effects in the approval process

The mine planning and approvals process in SA focuses on ensuring that mining companies/Proponents focus on identifying the environmental values that are required to be assessed and managed as a result of the impact of their development. Proponents are encouraged to be innovative about the way they propose to manage the identified water issues so as to protect environmental values and assess cumulative effects.

PIRSA Mineral Regulatory Guidelines specify that all mining proposals must include: water balance & risk assessment, details about the current State of the environment and an assessment of what impact the mine development will have on the current State of the environment, including water resources. At the MARP stage of the approvals process, Proponents are to establish and document what strategies they are proposing to achieve the environmental outcomes documented in the Mine Lease proposal. A description of the environmental value and risk assessment is a necessary part of the planning and approvals stage.

3.9 Data collection and reporting

Proponents are required to provide to the State government all groundwater data obtained through groundwater investigations associated with the mine approval process.

All data are managed in the State databases that are maintained by PIRSA (lithology) and DWLBC (groundwater). DLWBC's Observation Wells database is used to manage groundwater data collected from across the State. All information stored on the State databases is available for public access. The DLWBC is also responsible for regulating water quantity, groundwater salinity and groundwater dependent ecosystem issues, as well

as administering water allocations through the WAP. The regulation of water quality is the responsibility of EPA and managed separately.

4. Victoria

4.1 Victorian environmental assessment process

In VIC the mining approval process usually commences with application for a mining licence. Before a work plan for a mining proposal can be considered under the Mineral Resources (Sustainable Development) Act 1990, one of two assessment processes must be completed: an Environment Effects Statement (EES) may be required under the Environment Effects Act 1978; alternatively, if an EES is not required, a planning permit must be obtained under the Planning and Environment Act 1987. Once either an EES or planning process is completed, a work plan for a mine can be considered for approval. Major mining proposals are usually subject to the EES process.

4.2 Victorian water management and planning process

VIC's water allocation framework provides the basis for the management of VIC's water resource. VIC's water allocation framework takes a whole-of-system water management approach. It considers all water resources (groundwater and surface water) for both consumptive and environmental purposes at all phases of the water cycle.

The Department of Sustainability and Environment (DSE) is the statutory authority that manages VIC's water resources. The Victorian Water Act (1989) governs the regulation of water resources and has been designed to enable integrated management of surface water and groundwater resources. This is achieved through the development of Water Management Plans and licence provisions. Under the Act a Water Supply Protection Area may be declared to protect groundwater resources, surface water resources, or both. Licences issued under this Act are the regulatory instruments that define the management requirements of individual operations and include water management frameworks developed by the licensees.

The consumption of groundwater from VIC's aquifers is managed according to geographical area. The principal management unit for groundwater in VIC is the groundwater management unit (GMU), the boundaries of which often fall across more than one river basin. A GMU can be a Groundwater Management Area, Water Supply Protection Area, or an Unincorporated Area. There are 63 Groundwater Management Units (GMUs) and three unincorporated areas covering the State. Of the 62 groundwater management units, 24 are gazetted as Water Supply Protection Areas under the Act. The three unincorporated areas are managed under State-wide policy. Water corporations are responsible for providing water services and planning for future provision within their defined areas of operation. For groundwater, Rural Water Corporations are responsible for issuing licences and administering the Water Act.

Permissible consumptive volumes (PCV) can be used in Groundwater Management Areas (GMA) and Water Supply Protection Areas (WSPA). A PCV is set by the Minister for Water and is the maximum volume of water that can be allocated in the area. Many GMAs and WSPAs already have been allocated their PCV limit. In these areas new licences cannot be issued. To acquire new water from the GMAs or WSPAs, the Proponent must purchase a

licence from an existing groundwater entitlement holder. PCVs are imposed to prevent the resource being depleted or adverse impacts such as:

- Declining water levels;
- Reduced base flows in rivers and streams; and
- Changes to water quality.
- The declaration of a PCV for an area provides certainty as to the limits available for extraction.

In some instances there is a perception that the current state of groundwater resources is not very well understood and this can affect the allocation of water resources. The current water allocation framework is based on a fixed level of resources assessed for a specific geographic area, not taking into account geological characteristics such as the depth of water resources. There are approximately 2500 observation bores located across the state which are monitored regularly for water levels in order to assist with responsible management of groundwater resources for long term sustainability.

4.3 Jurisdictional inclusion of NWI objectives

VIC has a NWI Implementation Plan (April 2006) that is accredited by the NWC. The Implementation Plan guides policy and management of water issues within the Department of Primary Industries (DPI) and the DSE. The NWI and its objectives are credited with increasing the focus on groundwater, which is currently less well understood than surface water.

Proponents of mining projects are required to complete a Mining Work Plan which must contain the information listed in Schedule 13 of the Mineral Resources Development Regulations 2002. This includes a rehabilitation plan, environmental management plan, OHS plan and community engagement plan. Conducting regular monitoring of groundwater levels is another requirement of the work plan. The data are retained by the Proponent and are available for inspection as required.

Where groundwater abstraction is considered necessary, the Proponent requires a 'Licence to Take and Use Water' covered in Section 51 of the Water Act 1989. Water well or dam construction and the use of pumping equipment require a Section 67 Works Licence. Both Section 51 and Section 67 licences can be refused on the grounds that they may adversely impact on existing entitlements, environmental water requirements, drainage or a watercourse/aquifer. In addition, under Section 51 licences there is a need to transfer water into areas where Permissible Consumptive Volume limits have been reached or management plans are in place.

Both section 51 and section 67 licences can be refused on the grounds that that may adversely impact on the existing entitlements, the environment water reserves, drainage or a waterway/aquifer. Any entitlement of water is an entitlement to an amount of water that can be taken under specific conditions/specifications up to a maximum value. Licences are issued from between 1 and 15 years. Licence conditions may be changed at the time of renewal or on transfer to ensure compliance with a management plan for a Water Supply Protection Area.

Under the Water Act 1989, the Minister can determine permissive consumptive volumes (PCVs) for an area or water system. Such determinations are based on advice from DSE and relevant regional water authorities and Catchment Management Authorities. They serve to set a limit on the issue of rights to extract water to prevent over allocation.

The Minister may make a PCV order under Section 22A of the Water Act 1989, which imposes a cap on the water available to be taken from a certain area for a specific period of time. There are no limitations as to the reason this order can be imposed. Section 33I of the Water Act 1989, prevents the Minister from issuing a water share if he or she is of the opinion that the issue of share would exceed the PCV order. However PCVs for groundwater systems are set to reflect historic use and are not a measure of sustainable yield. There is currently no process in place to return over allocated systems to sustainable levels of use.

PCVs specify a maximum volume of water over any period that can be taken from an area or water system. PCVs apply to surface water and/or groundwater. PCVs have been declared for most surface water catchments in central VIC and priority groundwater management units throughout the State.

There are no identified impediments to VIC co-operating with other jurisdictions in regard to cross-jurisdictional mining/groundwater approvals.

4.4 Performance Indicators

The Victorian NWI Implementation Plan sets out the actions that VIC has already completed and provides detailed information for each NWI action on the tasks and timeframes to complete remaining commitments, and the context within which these actions are being implemented.

At the time of publication of the Implementation Plan for VIC, the NMMRC performance indicators had not been developed. VIC did not report against any performance criteria for the tasks contained in the Implementation Plan.

4.5 Jurisdictional Compliance with NWI Objectives

The Victorian framework for the management of water resources is generally compliant with NWI requirements that are relevant to the status of its water resources.

Amendments to the Water Act 1989 were completed in consultation with NSW, QLD and SA to understand the approaches to matters adopted in each of these jurisdictions. These amendments brought the Victorian legislation into conformity with the NWI objectives, and the common lexicon has been adopted where appropriate.

VIC has adopted a proactive method of managing systems that are currently within sustainable extraction limits through a precautionary approach known as the Environmental Water Reserve. Systems with existing entitlements that are currently above the sustainable yield will be capped and future water recovery completed where necessary.

VIC's risk assignment framework has been incorporated into the Water Act 1989, and it is consistent with the COAG approach.

4.6 Consideration of groundwater and surface water interaction

At a State level, management of surface water and groundwater is not integrated, largely due to the poor understanding of the links between surface water and groundwater systems. Project level impact assessments include a consideration of interactions between surface and groundwater through the Environment Effects Statement process or through extraction licence applications.

Proponents of mining projects are required to address the potential impact of their operation on both surface water and groundwater as part of the Environment Effects Statement (EES). Interaction between groundwater and surface water is addressed in the assessment of the EES, drawing in other agencies such as DSE or the water authorities for expertise where considered necessary.

The Section 51 licensing process equally requires proponents to address surface water and groundwater connectivity and the potential impact of their projected water requirements on either of these resources. Regulation of groundwater in VIC is achieved through universal licensing to control the standards of bore construction, and 'take and use' licensing of water taken for irrigation or commercial purposes. The licensing provisions for groundwater are the same as those for surface water. Licensing powers are derived from the Water Act and delegated to a number of Authorities that are subject to Government Policy and Ministerial Guidelines.

The Water Act provides for:

- licensing of drillers;
- licensing of bore construction;
- licensing of groundwater used for irrigation and commercial purposes;
- the continuation of private rights to groundwater for domestic and stock use;
- preparation of management plans in Water Supply Protection Areas.

New bore construction and groundwater extraction licence applications are assessed taking into account any adverse impacts on existing users, waterways, wetland and aquifers.

4.7 Assessing the availability and condition of groundwater

The Victorian Government has developed a long-term plan of water management which has been in place since 2004. Water is managed primarily through a progressive water allocation and entitlement system that enables the assessment and management of the availability and condition of groundwater throughout the state, Groundwater is considered a significant and valuable component of Victoria's water resources.

In groundwater systems, the initial Environmental Water Reserve comprises of the water available after accounting for existing licences and private rights, as well as any additional water available under the cap on entitlements for an aquifer (known as permissible annual

volumes; PAV). Environmental Water Reserves have been set using a precautionary principle based on the fact that the groundwater systems have not been fully allocated. Where an aquifer is either highly allocated or stressed, a water supply protection area will be declared and a groundwater management plan will be prepared.

Where groundwater is identified as being under threat of over use, the area is declared a Water Supply Protection Area and extractions are managed in accordance with approved management plans. The objective of the management plan is to make sure that the water resources of the Water Supply Protection Area are managed in an equitable manner to ensure the long term sustainability of those resources.

A management plan may impose restrictions on the taking of groundwater to prevent groundwater level decline or a permissible consumptive volume from being exceeded, or to ensure that the Environmental Water Reserve is maintained in accordance with the Environmental Water Reserve objective (note: the value of groundwater to the environment has been formally recognised through the establishment of the 'environmental water reserve'. The environmental water reserve places extra legal protection over environmental water).

Areas of VIC that are not covered by Groundwater Management Areas or Water Supply Protection Areas are known as 'unincorporated areas'. These are subject to the normal licensing requirements.

The Groundwater and Licensing Branch of DSE is the Victorian Government's lead organisation responsible for overseeing the monitoring and management of Victoria's groundwater resources. Potential impacts of mining on groundwater are addressed as part of the EES process and in the Mining Work Plan that is required by DPI.

The State Observation Bore Network comprises 2500 strategically placed bores across VIC that are used to monitor groundwater levels, water quality and interaction between groundwater and surface water systems. The information that is gathered through monitoring provides water resource managers with key data and knowledge to enable sustainable use and long term planning in relation to groundwater resources.

There is a groundwater database, managed by SKM on behalf of DSE that contains information on approximately 135,000 boreholes/wells throughout VIC that was last updated in 2002. More recent groundwater data can be accessed through the Victorian Water Resources Data Warehouse site [1]. As part of mine project applications, the availability and condition of groundwater is examined by the proponent through the EES approvals process.

There is a Regional Groundwater Committee examining the aquifers in the Latrobe Valley area immediately surrounding existing coal mines. All mining operators in the area are members of the Committee and are required to conduct ongoing monitoring of groundwater levels which are subject to five yearly evaluations.

[1] http://www.vicwaterdata.net/vicwaterdata/home.aspx

4.8 Assessing cumulative effects in the approval process

The potential for cumulative environmental effects should be identified in the Environment Effects Statement (EES) required for projects with potentially significant environmental impacts. Effective completion of this assessment is dependent on the ability of the Proponent to access information on the effects of other existing activities or potential projects, and the availability of relevant regional policies, plans, strategies, and regional data. Due to the constraints involved in quantitative assessment of cumulative effects, often only a quantitative assessment is practicable.

In VIC there are more than 63 Groundwater Management Areas (GMA) and Water Supply Protection Areas (WSPA) that have been declared by the Minister for the protection of groundwater resources. These areas are defined not only by a boundary at the ground surface, but with reference to a particular aquifer within a specified depth range below the surface. Both GMAs and WSPAs must be declared by the Minister, with the only difference being the level of management and public consultation required.

The Ministerial Guidelines for the Assessment of Environmental Effects under the Environment Effect Act provides guidance on assessment of cumulative effects as part of the EES process. Cumulative effects are considered in preparing management plans for WSPAs. Cumulative effects are also managed through setting Permissible Consumptive Volumes that cap the extraction from Groundwater Management Areas.

A GMA is declared to ensure a moderate level of monitoring and management can occur to secure the long term sustainability of the aquifer. A WSPA requires more intensive management through the development of a Groundwater Management Plan due to the extensive exploitation of the groundwater resource. In addition to seeking approval from the Minister, the declaration of a WSPA incorporates a mandatory public consultation process. July 2006, saw the introduction of Permissible Consumptive Volumes to set the current total licence allocation for a particular GMA or WSPA.

Once a WSPA is declared all trading into and out of the declared areas is suspended until a GMP is approved. At this time a consultative committee is appointed to assist with the development of the GMP. The consultative committees consist of local water users (at least 50 per cent of committee membership), government organisations and non-government organisations. Decisions relating to prescriptions outlined in the Plan are reached by consensus among the committee members. This process allows for the majority of members to agree in principle that the prescriptions are a fair and reasonable means of achieving the agreed objectives, which in essence allows for the cumulative impact assessment of the area's activities on the groundwater resource.

In VIC, cumulative effects of mining are recognised as a particular issue in the Latrobe Valley, due to the concentration of coal mining operations. However, Clean Coal Victoria (CCV), a planned new branch of DPI to be based in the Latrobe Valley, will be examining impacts of mining on groundwater as part of its remit, which includes rehabilitation and closure planning. It is recognised that cumulative effects are an issue in the Latrobe Valley, as most mines will need to conduct dewatering so that operations are conducted efficiently and safely.

Currently, dewatering abstractions are used for multiple purposes including the steam cycle, plant cooling and general purpose use associated with mining and power generation. However, due to different coal conversion processes being used, new technology is expected to require lower volumes of water for their efficient operation, and water that becomes excess to existing requirements will need to be managed by other means.

The government's sustainable water strategy for the eastern region of VIC (encompassing South Gippsland, Latrobe, Thomson, Mitchell, Tambo, Snowy and East Gippsland Basins) will take these issues into account. The strategy, which has recently been initiated, is being developed by DSE in partnership with rural and urban water corporations, catchment management authorities, other key regional stakeholders, interest groups and communities. Completion is expected within the next 12 to 18 months.

4.9 Data collection and reporting

As there is no formal requirement to consider cumulative effects of mining on groundwater, systematic data collection is limited. The groundwater database and the Victorian Water Resources Data Warehouse, as mentioned above, are the main sources of available data, in addition to that held by mining proponents. Data gathered by the Regional Groundwater Committee in the Latrobe Valley feeds into DSE's database.