

**ENVIRONMENTAL ASSESSMENT REQUIREMENTS UNDER THE EPBC ACT FOR  
THE NARRABRI GAS PROJECT, NSW (EPBC 2014/7376)**

**MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE TERMS OF REFERENCE**

References:

1. *Environment Protect and Biodiversity Conservation Act 1999* - section 51-55, section 96A(3)(a)(b), 101A(3)(a)(b), section 136, section 527E
2. *Environment Protect and Biodiversity Conservation Regulations 2000* - Division 3.2, 3.02(a)(b)(ii)(iii), Division 5.2, Schedule 4
3. The NSW Bilateral Agreement made under section 45 of the *EPBC Act* relating to environmental assessment – Item 6; and Schedule 1

**1 The action**

- a) The Environmental Impact Statement (EIS) must describe in detail all construction, operational and decommissioning components of the action. This must include the location of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on matters of national environmental significance (MNES) or upon Commonwealth land.
- b) The description of the action must include details on how the works are to be undertaken (including the various stages of development and operation, and their timing) and design parameters for those aspects of the structures or elements of the action that may have relevant impacts.
- c) The EIS must include how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action.
- d) Any activities that are directly associated with the action and which have been excluded from the proposed works (as identified in the referral) must be supported by clear justification as to why these activities are unlikely to impact upon MNES or upon Commonwealth land, or if applicable, whether such activities are covered by a separate EPBC approval. According to the referral excluded activities may include: appraisal and exploration activities; hydraulic fracturing; a gas transmission pipeline; the sourcing of electricity supply; certain components of the water treatment and management process; and installation and use of groundwater monitoring bores.

**2 The environment including MNES**

- a) The EIS must include a description of the environment and land uses within the proposal site and the surrounding areas, as well as other areas that may be affected by the action. This includes the following MNES and Commonwealth land protected by controlling provisions of Part 3 of the EPBC Act:
  - i Listed threatened species and communities (including suitable habitat) that are or are likely to be present in all areas of potential impact. To satisfy this requirement details must be presented on the scope, timing/effort (survey

season/s) and methodology for studies and surveys used to provide information on the relevant listed species/community/habitat (as identified in Appendix 1). This includes details of:

- how best practice survey guidelines have been applied
  - how surveys are consistent with (or a justification for divergence from) published Australian Government guidelines and policy statements.
- ii A description of the important water resources within all areas of potential impact, and a description of water related assets that are dependent on these resources, which is consistent with the requirements of the most recent version of the Independent Expert Scientific Committee (IESC) on Coal Seam Gas and Large Coal Mining Development's *Information Guidelines for Independent Expert Scientific Committee Advice on Coal Seam Gas and Large Coal Mining Development Proposals*, and which addresses the specific requirements of Appendix 2.
- iii A description of the environment of Commonwealth land in which the Siding Spring Observatory is situated. This includes a description of
- the people/communities who utilise the facilities
  - the qualities, characteristics, and heritage values for which the observatory is recognised
  - the social, economic and cultural aspects of the Siding Spring Observatory above.

A copy of the April 2014 version of the *Information Guidelines for Independent Expert Scientific Committee Advice on Coal Seam Gas and Large Coal Mining Development Proposals* is accessible from the following link:

<http://www.iesc.environment.gov.au/publications/information-guidelines-independent-expert-scientific-committee-advice-coal-seam-gas>

### **3 Impacts**

- a) The EIS must include a description of all potential impacts of the action on MNES and Commonwealth land (identified in Section 2). Impacts during the construction, operational and the decommissioning phases of the project must be addressed, and the following information provided for each relevant controlling provision:
- i a description of the relevant impacts of the action
  - ii a detailed analysis of the nature and extent of the likely direct, indirect and consequential impacts relevant to MNES, including likely short-term and long-term impacts
  - iii a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible
  - iv any technical data and other information used or needed to make a detailed assessment of the relevant impacts

- b) If the conclusion is made that any relevant controlling provision or element of a relevant controlling provision will not be impacted by the proposed action, then justification must be provided for how this conclusion has been reached. This includes any threatened species or ecological communities that are likely to be present on site, and water resources and dependent assets that may be impacted by the proposed action.
- c) The documentation provided must include information addressing all relevant impacts upon water resources and their dependent assets, and whether these impacts may also extend to habitat for listed threatened species and communities. The information must be consistent with the requirements of the most recent version of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development's *Information Guidelines for Independent Expert Scientific Committee Advice on coal seam gas and large coal mining development proposals* (see hyperlink above), and address the requirements identified at [Appendix 2](#).
- d) The EIS must include information addressing all relevant impacts upon the environment of Commonwealth land in which the Siding Spring Observatory is situated. This includes potential impacts upon:
- i the people/communities who utilise the facilities
  - ii the qualities, characteristics, and heritage values for which the observatory is recognised
  - iii the social, economic and cultural aspects of the Siding Spring Observatory.
- To support the assessment of potential heritage values associated with the observatory, the EIS must include a statement of heritage impacts.
- e) The EIS should address the potential for facilitated impacts upon MNES at the local, regional, state, national and international scale.
- f) The EIS should identify and address cumulative impacts, where potential project impacts are in addition to: (1) existing impacts of other activities; and (2) possible impacts from known potential future expansions or developments by the proponent and other proponents in the region.

Further details of threatened flora and fauna, and ecological communities protected by the controlling provisions of Part 3 of the EPBC Act are provided at [Appendix 1](#).

#### **4 Avoidance and mitigation measures / alternatives**

##### Avoidance and Mitigation Measures

- a) The EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action on MNES and Commonwealth land.
- b) The EIS must take into account relevant agreements and plans that cover impacts or known threats to MNES and Commonwealth land (including but not necessarily limited to):
- i any recovery plan and/or conservation advice for the affected species or community

- ii any threat abatement plan for a process that threatens an affected species or community
  - iii any wildlife conservation plan for the affected species
  - iv any Strategic Assessment.
- c) The EIS must include and substantiate specific and detailed descriptions of the proposed avoidance and mitigation measures based on best available practices. This must include the following elements:
- i A consolidated list of proposed avoidance and mitigation measures to prevent and/or minimise the relevant impacts of the action on MNES and Commonwealth land, including:
    - o a detailed description of such measures
    - o an assessment of the expected or predicted effectiveness of these measures, giving consideration to the scale and intensity of likely impacts and the on-ground benefits to be gained through such measures
    - o a description of the anticipated outcomes that measures will be achieved given consideration to known precedents
    - o any statutory or policy basis for the mitigation measures
    - o the likely cost of proposed mitigation measures.
  - ii A detailed outline of a plan for the continuing management, mitigation and monitoring of relevant MNES and Commonwealth land impacts of the action, including a description of the outcomes that will be achieved and any provisions for independent environmental auditing.
  - iii Where appropriate, each project phase (construction, operation, decommission) must be addressed separately. It must state the environmental outcomes, performance criteria, monitoring, reporting, corrective action, contingencies, responsibility and timing for each environmental issue being addressed.
  - iv The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.
- d) The EIS must address the requirements for ongoing managements and monitoring of potential impacts to water resources identified at [Appendix B](#) and as prescribed in the latest version of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development's *Information Guidelines for Independent Expert Scientific Committee Advice on coal seam gas and large coal mining development proposals* (see hyperlink above).

#### Alternatives

- a) The EIS must include any feasible alternatives to the action to the extent reasonably practicable, including:
  - i if relevant, the alternative of taking no action

- ii a comparative description of the impacts of each alternative on the MNES and Commonwealth land protected by controlling provisions of Part 3 of the EPBC Act for the action
  - iii sufficient detail to make clear why any alternative is preferred to another.
- b) The short, medium and long-term advantages and disadvantages of the options presented must also be discussed.

## **5 Residual impacts / offsets**

### Residual impacts

- a) The EIS must provide details of the likely residual impacts upon MNES and Commonwealth land after the proposed avoidance and mitigation measures have been taken into account. This includes:
- i the reasons why avoidance or mitigation of impacts may not be reasonably achieved
  - ii quantification of the extent and scope of significant residual impacts.

### Offset Package

- a) The EIS must include details of an offset package to be implemented to compensate for residual significant impacts associated with the project, as well as an analysis of how the offset meets the requirements of the Department's *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy October 2012 (EPBC Act Offset Policy) or any alternative methodology that delivers long-term environmental benefits for the relevant Matter(s) of NES in accordance with the objects of the EPBC Act, as advised by the Minister.
- b) Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain.
- c) Offsets should compensate for an impact for the full duration of the impact.
- d) Offsets must directly contribute to the ongoing viability of the MNES and Commonwealth land impacted by the project and deliver an overall conservation outcome that improves or maintains the viability of the protected matter, compared to what is likely to have occur under 'status quo' (i.e. if the action and associated offset had not taken place).
- e) Note, offsets do not make an unacceptable impact acceptable and do not reduce the likely impacts of a proposed action. Instead, offsets compensate for any residual significant impact.
- f) The EIS must provide:
- i details of the offset package to compensate for significant residual impacts on MNES and/or Commonwealth land

- ii an analysis of how the offset package meets the requirements of the relevant offset policy.

Further details of information requirements for EPBC Act offset proposals are provided at [Appendix 3](#).

## **6 Environmental record of person(s) proposing to take the action**

- a) The information provided must include details of any past or current proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:
  - i the person proposing to take the action
  - ii the person making the application for any related permits.
- b) If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.

## **7 Economic and social matters**

- a) The economic and social impacts of the action, both positive and negative, must be analysed. Matters of interest may include:
  - i details of any public consultation activities undertaken, and their outcomes
  - ii details of any consultation with Indigenous stakeholders
  - iii projected economic costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies
  - iv employment opportunities expected to be generated by the project (including construction and operational phases).
- b) The economic and social impacts must include impacts at the local, regional and national level.
- c) Details of the relevant cost and benefits of alternative options to the proposed action, as identified in [Section 4](#), should also be included.

## **8 Information sources provided in the EIS**

For information given in the EIS, the EIS must state:

- a) the source of the information
- b) how recent the information is
- c) how the reliability of the information was tested
- d) what uncertainties (if any) are in the information
- e) what guidelines, plans and/or policies have been considered during preparation of the EIS.

## **9 Conclusion**

An overall conclusion as to the environmental acceptability of the proposal on MNES and Commonwealth land must be provided, which includes:

- a) a discussion on how consideration has been given to the objects of the EPBC Act, the principles of ecologically sustainable development, and the precautionary principle (as detailed at [Appendix 4](#))
- b) justification for undertaking the proposal in the manner proposed, including the acceptability of the avoidance and mitigation measures
- c) if relevant, a discussion of residual impacts and any offsets and compensatory measures proposed or required for significant residual impacts on MNES and Commonwealth land, and the relative degree of compensation and acceptability.

## **10 Structure**

Unless the above requirements are addressed within a separate stand alone chapter, then table 1 at [Appendix 5](#) must also be included in the EIS.

## Appendix 1

### SUMMARY OF RELEVANT THREATENED FLORA, FAUNA AND ECOLOGICAL COMMUNITIES

The controlled action is considered likely to have a significant impact on the following listed threatened species and ecological communities:

- *Anthochaera phrygia* (regent honeyeater) - endangered
- *Dasyurus maculates maculatus* (spotted-tailed quoll) - endangered
- *Phascolarctos cinereus* (combined koala populations of Qld, NSW and the ACT) - vulnerable
- *Nyctophilus corbeni* (south-eastern long-eared bat) - vulnerable
- *Pseudomys pilligaensis* (Pilliga mouse) - vulnerable
- *Bertya opponens* (coolabah bertya) - vulnerable
- *Lepidium aschersonii* (spiny peppergrass) - vulnerable
- *Lepidium monoplacoides* (winged peppergrass) - vulnerable
- *Rulingia procumbens* – vulnerable
- *Tylophora linearis* - endangered
- the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community- endangered
- the weeping myall woodlands ecological community - endangered

A significant impact could not be ruled out for the following protected matters:

- *Botaurus poiciloptilus* (Australasian bittern) – endangered
- *Lathamus discolor* (swift parrot) – endangered
- *Polytelis swainsonii* (superb parrot) – vulnerable
- *Rostratula australis* (Australian painted snipe) – endangered
- *Leipoa ocellata* (malleefowl) – vulnerable
- *Bidyanus bidyanus* (silver perch) – critically endangered
- *Maccullochella peelii* (Murray cod) – vulnerable
- *Litoria booroolongensis* (booroolong frog) – endangered
- *Chalinolobus dwyeri* (large-eared pied bat) – vulnerable
- *Petrogale penicillata* (brush-tailed rock wallaby) – vulnerable
- *Anomalopus mackayi* (five-clawed worm-skink) – vulnerable
- *Aprasia parapulchella* (pink-tailed worm-lizard) – vulnerable
- *Uvidicolus sphyrurus* (border thick-tailed gecko) – vulnerable
- *Androcalva procumbens* – vulnerable

- *Bertya opposens* – vulnerable
- *Cadellia pentastylis* – vulnerable
- *Philothea ericifolia* – vulnerable
- *Prasophyllum* sp. *Wybong* – critically endangered
- *Thesium australe* – austral toadflax – endangered
- the coolibah – black box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions ecological community - endangered
- the grey box (*Eucalyptus macrocarpa*) grassy woodlands and derived native grasslands of south-eastern Australia ecological community – endangered
- the natural grasslands on basalt and fine-texture alluvial plains of northern NSW and southern Qld ecological community – critically endangered
- the white box-yellow box-Blakely's red gum grassy woodland and derived native grassland ecological community – critically endangered

## Appendix 2

### SUPPLEMENTARY GUIDANCE FOR ADDRESSING POTENTIAL IMPACTS TO WATER RESOURCES

#### 1. DESCRIPTION OF THE ENVIRONMENT

A description of the environment should include data relating to the climatic and hydro-meteorological setting of the region, as well as all relevant information generated by a bioregional assessment (where one has been completed) that can indicate the baseline conditions of the proposed development area.

Where a bioregional assessment has not yet been completed, the best available information should be used to identify and describe the existing condition of water resources and water-related assets at a regional scale.

Trends and seasonal variation in the condition of water resources and water-related assets should also be identified. All water resources and water-related assets must be clearly identified on accompanying maps, as well as in the text.

All results of modelling should take account of the sensitivity and uncertainty of the model, by presenting results in a probabilistic way (as data ranges with probabilities stated).

#### 1.1 Description of the environment – water resources

A description of the water resources should include:

- a) the water resources of the site and region
- b) geology and hydrogeology at both site and regional scale
- c) development or confirmation of the existing Narrabri gas field groundwater conceptual model by using actual data from recent drilling activities. This includes the updated geological maps and cross-sections, hydraulic parameters garnered from downhole wireline logging and pump tests
- d) a numerical groundwater model that includes at least two years of high quality groundwater collected from monitoring bores in the shallow and deep groundwater systems to allow meaningful calibration for steady state conditions
- c) hydraulic characteristics (including hydraulic conductivity and storage characteristics) for each formation
  - provision of baseline data on the chemistry (including methane), isotopic and physical characteristics (including wireline logging) for potentially affected hydro-stratigraphic units
  - step drawdown, constant rate (or head) pump tests (three days minimum plus recovery) to determine good hydraulic parameters (including leakage factors in the lower transmissivity aquitards)
  - a detailed water balance using actual real data collected to determine all sources of groundwater recharge, abstraction and discharge from the project area

- d) baseline water quality for all relevant surface and groundwater resources, including chemistry and ecology, at the local and regional scale
- e) a detailed water balance using actual real data collected to determine all sources of groundwater recharge, abstraction and discharge from the project area
- f) based on the results of numerical modelling, water and salt balances for the proposed site and region, detailing the set of stores and the movement between those stores under current conditions, taking into account seasonal and long term climate variation
- g) direction of groundwater flow and potentiometric surfaces (contours of groundwater head) for each hydrogeological unit likely to be impacted by the proposed action. The measured potentiometric heads (standing water levels) on which the potentiometric surfaces are based should also be presented
  - groundwater level trends versus climatic variations (especially for drought conditions)
  - an assessment of potential connectivity between the ephemeral Bohena Creek, the Bohena Alluvial unconsolidated aquifer, the Keelindi bed leaky aquitard, and the Pilliga sandstone consolidated aquifer
- h) surface water flow regimes and flow directions
- i) all local drainages and estimates of baseflow to each local watercourse
- j) identification of relevant water plans that may apply to the area
- k) existing water quality guidelines, targets, environmental flow objectives and requirements for the ecosystems of the surface catchment and groundwater basin within which the project is based
- k) the ecological characteristics and processes of the water resources, including the biological diversity, species composition and ecosystem function.

## **1.2 Description of the environment – water-related assets**

A description of water-related assets should include an estimation of water quantity and quality requirements (i.e. regional water use) for:

- a) aquatic and terrestrial ecosystems that are dependent on the water resource, including those dependent upon the particular geomorphology of a water resource
- b) ecosystems that are dependent on springs and groundwater, including identification of the relevant source hydrogeological unit
- c) regional communities, industrial and/or agricultural activities, and indigenous cultural needs or assets that are dependent on the water resource
- d) fauna, flora and species that are dependent on the water resource.

## 2. RELEVANT IMPACTS

Relevant impacts should include impacts on water quality and quantity and water-related assets, including cumulative impacts.

### 2.1 Data

When providing information on the relevant impacts it is important that the PER or EIS provides any technical data or other information that was used for modelling or assessing the relevant impacts in the preparation of the PER or EIS, or are needed to make a detailed assessment of the relevant impacts.

This should include hydrographs, raw data such as records of seasonal and/or historic annual variations in water quality and quantity, bore logs and water quality parameters (such as relevant inorganic chemicals). This should also include mapping and diagrams to illustrate modelled drawdown (both at local and regional scales), modelled head distribution, bore locations and geological structures to assist in the interpretation of model outcomes. Data should include dates and locations of measurements, flow conditions, and elevations of the reference points from which water levels were measured.

Uncertainty of all data should be addressed, including seasonal and long term climate variations as well as the development of the activity over time. All results of modelling should take account of the sensitivity and uncertainty of the model by presenting results in a probabilistic way (as data ranges with probabilities stated).

### 2.2 Relevant impacts – water resources and water-related assets

An assessment of the likely significant impacts on important water resources and water-related assets should include:

- a) a numerical model, incorporating water quality and quantity (including salt) balances for both the project site and broader area of potential impact, including:
  - i. an assessment of the changes that occur as a result of the proposed development on the quality and quantity of water within any store, or flow of water and salt between these stores
  - ii. identify any water necessary for the project that is not available from within the extraction and treatment loops that must be imported from elsewhere.
- b) a quantitative prediction of subsidence and effects from dewatering and depressurisation (including lateral effects) on surface topography, groundwater, surface water and movement of water across the landscape, and possible fracturing of confining layers throughout the life of the operation
- c) discussion of seismic impacts from drilling and fracking on the structure of the receiving, surrounding and overlaying geology and the potential for impacts on aquifer connectivity with either the surface or other aquifers
- d) a quantitative prediction of the extent of the cone of depression and consequential impacts of the cone of depression and voids on surface topography, groundwater, surface water and movement of water across the landscape throughout the life of the project, post mining, and final site management.
- e) predictions for stressors and toxicants, including chemical composition, mass and volumes, utilised and/or released to a water resource over the life of the project

- f) predicted volumes and quality of water proposed to be used during mining, including within the mine itself (for example, coal washing, dust suppression) and for other associated activities (for example, cooling or other industrial processes)
- g) details of impacts to hydrogeological units, including units directly and indirectly impacted by the action
- h) the impacts on the hydraulic properties, including both vertical and horizontal properties of hydrogeological unit geology, including the potential for physical transmission of water within and between formations, the effects of depressurisation due to gas and water extraction, and estimates of the likelihood of leakage of contaminants from coal beds through geological formations
- i) the impacts associated with surface water extraction, releases and/or diversions, including alterations to flow regimes, flood heights, and/or erosion/sedimentation and impacts to habitat
- j) the identification of any landscape modifications that will impact on surface water flow, i.e. a geomorphological assessment
- k) an estimate of the quality and quantity of operational discharges of water, including potential emergency discharges due to unusual events, and the likely impacts on water-related assets
- l) clarification of discharge sources (both of contaminated water and airborne contaminants)
- m) an assessment of the direct and indirect quality and quantity impacts on the water-related assets previously identified, with reference to the Australian Guidelines for Water Quality Monitoring and Reporting

<http://www.environment.gov.au/resource/national-water-quality-management-strategy-australian-guidelines-water-quality-monitoring-0>

### **2.3 Relevant impacts – modelling surface and groundwater impacts**

In addressing the relevant impacts to water resources it will be necessary to provide the results of a numerical surface and groundwater model that is calibrated to baseline conditions and enables a probabilistic evaluation of potential future scenarios, including a sensitivity and uncertainty analysis, consistently with the Modelling Guidelines. The model should be peer reviewed. The water modelling should:

- a) outline the model's conceptualisation of the system or systems, including key assumptions and the model's limitations
- b) represent each water resource, the storage and flow characteristics of each; linkages, if any, between water resources and the existing flow regime, including recharge and discharge pathways of the hydrogeological units, and any changes that are predicted to occur upon commencement of the development activities
- c) simulate the proposed sequence of development and provide predictions of water flow rates and water level/pressure changes in each hydrogeological unit for the life of the action and beyond

- d) provide information on the progress of development, including timing for maximum impact of water resources, time to maximum drawdown and time for drawdown equilibrium to be reached, and timing for return to predevelopment conditions
- e) identify the volumes of water predicted to be used on an annual basis with an indication of the proportion supplied from each water resource
- f) include recommendations, a program for review, and an update of the model as more data and information become available.

Note: the Australian groundwater modelling guidelines (Barnett 2012) should be used as a best practice guide to groundwater modelling at the following link:

<http://archive.nwc.gov.au/library/waterlines/82>

#### **2.4 Relevant impacts – cumulative and indirect impacts**

The EIS should identify and address cumulative impacts that take into account all relevant actions (past, present and/or reasonably foreseeable) to determine the risks and impacts posed by the proposed action, in combination with other developments that currently or are likely to occur within the area (see the significant impact guidelines 1.3: coal seam gas and large coal mining developments – impacts on water resources for more information on cumulative impacts). The EIS should include:

- a) estimates of sediments as total suspended solids (TSS) and salts (including metals, metalloids and organic salts) being discharged from the development (including for other uses, such as irrigation or drinking water). This should also include estimates from overflow events from mine and sediment dams. These figures should be compared to background load levels, and with the estimated loads from current and likely future developments, both upstream and downstream
- b) mapping of existing and proposed mining and exploration activities within the catchment and region and modelling of potential cumulative impacts.
- c) details of the total existing and planned licensed and actual take of water for consumptive, industrial and agricultural purposes in the surface catchment and groundwater basin within which the proposed action is based
- d) details of the total existing and planned discharges of waste water and injections of water into hydrogeological units from other mining and industrial purposes in the surface catchment and groundwater basin within which the proposed action is based
- f) details of the proportional increase in water resource use and impacts as a consequence of the proposed action
- g) the overall level of risk to water-related assets that combine probability of occurrence with severity of impact of current or potential multiple actions.

The EIS should reference any relevant regional water resource/catchment management or operational plans and/or regional water balance models in relation to the discussion on cumulative and indirect impacts.

### **3. PROPOSED SAFEGUARDS AND MITIGATION MEASURES**

The Environment Management Plan that is included in the EIS should:

- a) include any water quality or quantity trigger values for water resources and water-related assets, as relevant, which would trigger corrective actions
  - b) include details of the baseline monitoring program and a proposed monitoring program to monitor operational impacts to groundwater and surface water resources. The proposed water monitoring program should:
    - i. clearly define monitoring objectives, including what environmental values are being protected
    - ii. describe what water quality guidelines will be used and how the parameters in the guidelines were derived
    - iii. detail corrective actions that will be taken should the monitoring identify that water resources and/or water-related assets are being impacted by the proposed action.
- The assessment documentation should include:
    - a firm commitment to active compliance monitoring, and to having an experienced field hydrologist on site during drilling
    - a commitment to report all well completion logs to the NSW Office for coal seam gas within one or two weeks. Six months is considered too long to ensure the correct emplacement of casing and the sealing off of alluvial aquifer and Pilliga sandstone aquifer from each other, and from Triassic and Permian hydrostratigraphic units (including coal measures)

### Appendix 3

#### INFORMATION REQUIREMENTS FOR EPBC ACT OFFSET PROPOSALS

- a) Details in relation to the proposed offsets package, including:
- i the location and size, in hectares, of any offset site(s)
  - ii maps for each offset site that clearly show:
    - o the relevant ecological features
    - o the landscape context
    - o the cadastre boundary.
  - iii the current tenure arrangements (including zoning and ownership) of any proposed offset sites
  - iv confirmed records of presence (or otherwise) of relevant protected matter(s) on the offset site(s)
  - v details of studies and surveys used to confirm the presence of individuals and or likely habitat within offset site(s), including the scope, timing/effort (survey season/s) and methodologies employed
  - vi detailed information regarding the extent (in hectares) and quality of habitat for relevant protected matter(s) on the offset site. The quality of habitat should be assessed in a manner consistent with the approach outlined in the document titled *How to use the offset assessment guide* available at:  
<http://www.environment.gov.au/epbc/publications/environmental-offsets-policy.html>.
- b) Provide information and justification regarding how the offsets package will deliver a conservation outcome that will maintain or improve the viability of the protected matter(s) consistent with the *EPBC Act environmental offsets policy* (October 2012) including:
- i management actions that will be undertaken to improve or maintain the quality of the proposed offset site(s) for the relevant protected matter(s). Management actions must be clearly described, planned and resourced as to justify any proposed improvements in quality for the protected matter(s) over time
  - ii the time over which management actions will deliver any proposed improvement or maintenance of habitat quality for the relevant protected matter(s)
  - iii the risk of damage, degradation or destruction to any proposed offset site(s) in the absence of any formal protection and/or management over a foreseeable time period (20 years). Such risk assessments may be based on:
    - o presence of pending development applications, mining leases or other activities on or near the proposed offset site(s) that indicate development intent

- average risk of loss for similar sites
    - presence and strength of formal protection mechanisms currently in place.
  - iv the legal mechanism(s) that are proposed to protect offset site(s) into the future and avert any risk of damage, degradation or destruction.
- c) Provide information regarding how the proposed offsets package is additional to what is already required, as determined by law or planning regulations, agreed to under other schemes or programs or required under an existing duty-of-care.
- d) The overall cost of the proposed offsets package; including costs associated with, but not necessarily limited to:
  - i acquisition and transfer of lands/property
  - ii implementation of all related management actions
  - iii monitoring, reporting and auditing of offset performance.

## Appendix 4

### THE OBJECTS OF THE EPBC ACT, PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT AND THE PRECAUTIONARY PRINCIPLE

#### 3 Objects of the Act

The *objects of the Act* are:

- a) to provide for the protection of the environment, especially those aspects of the environment that are MNES
- b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources
- c) to promote the conservation of biodiversity
- (ca) to provide for the protection and conservation of heritage; and
- d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples
- e) to assist in the co-operative implementation of Australia's international environmental responsibilities
- f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity
- g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

#### 3A Principles of Ecologically Sustainable Development

The following principles are *principles of ecologically sustainable development*:

- a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- c) the principle of inter-generational equity - that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
- e) improved valuation, pricing and incentive mechanisms should be promoted.

### **Precautionary principle**

The *precautionary principle* is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.

**Appendix 5**

**TABLE 1: EPBC MATTERS ADDRESSED BY ASSESSMENT DOCUMENTATION**

<b>ToR</b>	<b>Requirement</b>	<b>Section in Assessment Documentation</b>
1	Action	
2	Description of the environment	
3	Impacts	
4	Avoidance and mitigation measures	
4	Management, mitigation and monitoring plan	
5	Residual impacts / offsets	
6	Environmental record of the person(s) proposing to take the action	
7	Economic and social matters	
8	Information sources provided in the EIS	
9	Conclusion	

Note: This table is not required if the EIS contains a separate chapter addressing MNES.