Ensham Central Project

Draft Terms of Reference

for

ENVIRONMENTAL IMPACT STATEMENT

November 2004

HANSEN CONSULTING

Ensham RESOURCES

ENSHAM CENTRAL PROJECT

DRAFT TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT STATEMENT

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EXECUTIVE SUMMARY

The executive summary should convey the most important aspects of the EIS to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms. The structure of the executive summary should follow that of the EIS and focus strongly on the key issues.

1.0 INTRODUCTION

The introduction should explain the purpose of the EIS. It should also define the audience to whom it is directed, and contain an overview of the structure of the document.

1.1 PROJECT PROPONENT

This section should provide details of the project proponent, including details of any joint venture partners.

1.2 PROJECT DESCRIPTION

A brief description of the key elements of the project should be provided and illustrated. Any major associated infrastructure requirements should also be summarised. The relationship and interactions with the existing approved Ensham mining operations should also be described.

1.3 PROJECT OBJECTIVES AND SCOPE

This section should provide a broad statement of the objectives which have led to the development of the proposal, and a brief outline of the events leading up to the proposal's formulation, including envisaged time scale for implementation and project life, and actions already undertaken within the project area.

1.4 THE EIS PROCESS

This section should state the objectives of the environmental impact assessment under the *Environmental Protection Act 1994*. This section should provide a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the project. This section should also describe the mechanisms for public input to the approval process.

1.4.1 Objectives of the EIS

This section should provide a statement of the objectives of the EIS. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives.

The purpose of the EIS is to:

- provide public information on the need for and likely effects of the project;
- set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values; and
- demonstrate how environmental impacts can be managed.

1.4.2 Submissions

The reader should be informed as to how and when public submissions on the draft EIS can be made and how any submissions will be taken into account in the EPA's decision-making process.

1.5 PUBLIC CONSULTATION PROCESS

This section should outline the methodology adopted for stakeholder consultation. Information about the consultation that has taken place and the results of such consultation should be provided. This should include a list of stakeholders consulted, including all affected and interested persons, as well as a summary of the consultation process, stakeholder issues identified and description of how stakeholder issues were addressed.

An overview of the proposed stakeholder consultation strategy for the future stages of the project should also be provided.

1.6 PROJECT REGULATORY APPROVALS

1.6.1 Local and State Government Approvals

This section should explain the legislation and policies controlling the approvals process, including all relevant local and state government approval requirements. Reference should be made to the Queensland *Environmental Protection Act 1994, Integrated Planning Act 1997* and other relevant Queensland laws. Relevant Local Government planning controls, local laws and policies applying to the development should also be described. A list of the approvals required for the project and the expected program for approval of applications should also be provided.

This section should discuss the project's consistency with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans), and with legislation, standards, codes or guidelines available to monitor and control operations on site.

The requirement for involvement of the Commonwealth's Department of Heritage in the project approval process in relation to any impacts on matters of national environmental significance as defined by the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* should be discussed in this section. The discussion should include any reference to specific sections of the EIS where impacts on matters of environmental significance are addressed.

1.6.2 Commonwealth Government Approvals

The Project has been declared a "Controlled Action" by the Commonwealth Department of Environment and Heritage (DEH) under the EPBC Act due to potential impacts on threatened ecological communities. These communities are listed in the EPBC Act and are matters of National Environmental Significance (NES). The EIS process will be accredited for the purpose of assessment under Part 8 of the EPBC Act.

This section should describe the DEH approval process under the EPBC Act and reference relevant sections of the EIS addressing the impact assessment for the threatened communities and any other matters of NES.

1.7 PROJECT NEED AND ALTERNATIVES

1.7.1 Project Justification

The justification for the project should be described, with particular reference made to the economic and social benefits. The status of the project should be discussed in a regional, State and National context.

1.7.2 Alternatives to the Project

This section should describe feasible alternatives, including any conceptual, technological and locality alternatives to the project, and discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Reasons for selecting the preferred options should be explained in terms of relevant technical, commercial, social and natural environmental aspects.

2.0 DESCRIPTION OF THE PROJECT

The objective of this section is to describe the project through its lifetime of construction, operation and decommissioning. The section will allow further assessment of which approvals may be required and how they may be managed over the life of the proposal.

2.1 PROJECT SITE

This section should include a description of the site and surrounding area including present land use and zonings, land ownership and land tenure, and a description of the existing Ensham Mine site. The site location should be described in a local and regional context. The section should be illustrated on maps at suitable scales.

Real property descriptions of the project site should also be provided.

2.2 COAL RESOURCE

This section should summarise the results of studies and surveys undertaken to delineate the coal resource. A description of the geology, location, tonnage and quality of the coal resource should be made. Coal seams that are stratigraphically higher or lower than those being mined, or seams located under infrastructure should be identified.

In addition, maps should be provided showing the location of the project area including:

- the location of the resource;
- the location and boundaries of mining tenures, granted or proposed, to which the project area is or will be subject; and
- the location and boundaries of the open cut and underground mine areas.

This section should describe the way in which the Proponent will ensure the resource recovery is maximised and that (as far as practicable) other resources are not adversely affected or sterilised by the Project.

2.3 MINING OPERATIONS

This section should include a description of the proposed open cut and underground mining operations. This should include:

- open cut and underground mine plans;
- open cut and underground mine sequence and schedules;
- a description of open cut and underground mining methods, including mining plant and equipment, and sources and location of overburden and topsoil material; and

- integration of the Project open cut and underground mining operations with the existing approved Ensham open cut mining operations.

2.4 MINE INFRASTRUCTURE

This section should provide descriptions, with concept and layout plans, of all infrastructure requirements for the Project. This should include a description of all infrastructure associated with the project, including new infrastructure and upgrading of existing infrastructure.

2.4.1 Coal Handling and Transport

A description, including concept and layout plans, should be provided for all coal handling and coal transport infrastructure on the mine site. Coal transport from the site should also be described. This should include description of the capacity of the coal handling, washery, stockpiling and transport systems and a washplant process chart showing inputs, products, wastes and recycle streams.

2.4.2 Rejects and Tailings Disposal

This section should describe the quantities and characteristics of coal reject material. A description of the transport and disposal strategy for coal rejects should be provided, including plans for emplacement areas and associated environmental controls.

2.4.3 Flood Protection and Drainage Infrastructure

Descriptions of proposed mine flood protection and drainage infrastructure, including infrastructure associated with mining in the Nogoa River floodplain, are to be provided. These are to include the location, design criteria and construction requirements for flood protection levees and creek diversions.

2.4.4 Transport

This section should describe arrangements for the transport of plant, equipment, wastes and personnel during both the construction phase and operational phases of the project. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

2.4.5 Energy

This section should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any relevant Commonwealth, State and Local government policies.

2.4.6 Water Supply and Storage

This section should provide information on water usage by the project and the proposed water supply sources. Details of the Project's potable water demand (including any temporary demands during construction), supply source, and any on-site storage and treatment should also be described.

2.4.7 Sewerage

This section should describe, in general terms, the sewerage infrastructure required by the project.

2.4.8 Other Infrastructure

A description should be provided of any other infrastructure directly related to the project not described in other sections, such as:

- workforce camps;
- fuel storage areas;
- equipment hardstand and maintenance areas; and
- workshops and other buildings.

2.5 REHABILITATION AND DECOMMISSIONING

The strategies and methods for progressive and final rehabilitation of the environment disturbed by the mining activities should be described in the context of the expected final landforms for nominated final land uses. The final topography of voids, overburden emplacements, rejects and tailings disposal areas, and areas affected by mine subsidence should be described. The post mining land suitability of the various land disturbance types should be described in terms of the characteristics of the relevant materials and specified final landform.

The means of decommissioning the Project, in terms of removal of plant, equipment, structures and buildings, should be described. The methods proposed for the stabilisation of the affected areas should be specified. Final rehabilitation of the plant site should be discussed in terms of ongoing land use capability, management of any residual contaminated land and other land management issues.

2.6 CONSTRUCTION PHASE

The extent and nature of the project's construction phase/s should be described. The description should include the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the site for construction. Any staging of the proposal should be described including development sequencing and timeframes.

2.7 WORKFORCE REQUIREMENTS

Information should be provided on the workforce numbers to be employed in the facility's operations during its various phases (construction, commissioning, operation and decommissioning). A brief description of the accommodation requirements for the workforce and how they will be transported to the site should be provided. Comment should be made on the anticipated basis of employment (permanent, contract, etc).

3.0 ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are:

- To describe the existing environmental values of the area which may be affected by the proposal. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which may be included as appendices to the EIS.
- To describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described. Include analysis of any cumulative impacts caused by the proposal.
- To present environmental protection objectives and the standards and measurable indicators to be achieved.

This section should address all elements of the environment, (land, water, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk) in a way that is comprehensive and clear. To achieve this, the topics to be addressed for each element are:

- **Environmental values affected**: describe the existing environmental values of the area to be affected, including areas that may be affected by any cumulative impacts (refer to any background studies in Appendices).
- **Impact on environmental values**: quantitatively describe the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, the requirements and recommendations of relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and Integrated Catchment Management Plans should be addressed.
- **Environmental protection objectives**: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Where relevant, include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable).
- **Control strategies to achieve the objectives**: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives.
- **Monitoring programs**: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.

- **Auditing programs**: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed.
- **Management strategies**: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented.

3.1 LAND

3.1.1 Description of Environmental Values

Land use

The EIS should provide a description of current land tenures and land-uses in the project proposal area, with particular mention of land with special purposes. Areas covered by native title claims should be identified.

A map at a suitable scale showing existing land-uses and tenures, and the proposed mine and plant locations should be provided for the entire project proposal area and surrounding land that could be affected by the development. The location of existing dwellings, and the zoning of all affected lands according to any existing town or strategic plan should be included.

The potential impact on adjacent agricultural land, urban and recreational areas should be described, and any constraints on future developments in the mining area outlined.

Sensitive Environmental Areas

The EIS should identify whether areas that are environmentally sensitive could be affected, directly and indirectly, by the project proposal. Also, areas sensitive to environmental harm caused by the project proposal can be determined through site specific environmental impact assessment processes.

The provisions of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed in particular whether there are relevant national environmentally significant matters.

The proximity of the project elements to any of these areas should be identified.

Infrastructure

The location and owner/custodians of all tenures, reserves, roads and road reserves, and stock routes covering the affected land should be shown. Indicate locations of power lines and any other easements.

Details should be provided of the impacts on environmental values of any road works associated with the Project.

Topography/geomorphology

The contour information for the project proposal site should be detailed at suitable increments, with levels shown with respect to Australian Height Datum (AHD).

Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the proposal area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Properties that may influence stability, occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the proposal, should be described.

Soils

A soil survey of the project proposal sites should be conducted, with particular reference to the physical and chemical properties of the materials which will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land (eg. for dryland cropping or grazing uses). Information should also be provided on soil stability and suitability for construction of proposal facilities.

Soil profiles should be mapped at a suitable scale and described according to accepted standards (eg. the Australian Soil and Land Survey Field Handbook (McDonald *et al.* 1990), or the Land Resource Assessment of the Windeyers Hill Area (Burgess 2003)). An appraisal of the depth and quality of useable soil should be undertaken. Information should be presented according to the standards required in the Planning Guidelines: the Identification of Good Quality Agricultural Land (DPI, DHLGP, 1993), and the State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

The description of soils and overburden at the project proposal site should include:

- profile description, including stability, soil structure and texture, erodibility, dispersivity and rockiness;
- salinity and sodicity;
- nutrient status, including Cation Exchange Capacity; and
- pH.

This information should then be used to:

- describe the present land suitability of soils on the site;
- prepare a land suitability map of the proposed mining lease area, prepared in accordance with the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995, specifically Section 6.1 Land Suitability Assessment Techniques. These

guidelines recommend that disturbed areas be mapped more intensively than non-disturbed areas and provide guidance on acceptable mapping scale and site intensity. Land suitability assessments should be completed for rainfed cropping and grazing covering all disturbed and undisturbed areas within the proposed mining lease areas. This assessment will set out soil and landform limitation subclasses assigned to soil mapping units in order to derive land suitability classes;

- prepare a map of Good Quality Agricultural Land based on the land suitability assessments prepared in accordance with the above requirement; and
- characterise the overburden stripped ahead of coal extraction.

Provision should also be made for the ongoing characterisation of spoil material as mining progresses to maximise the suitability of the replaced soils for the nominated final land-use.

Discuss constraints of final landform soil profile characteristics (physical and chemical) on nominated post-mining land-uses. Particular regard should be given to management and maintenance inputs required to sustain final landform stability and productivity when compared to similar undisturbed landforms.

Scenic Values

This section should include an assessment of the visual impact in terms of the extent and significance of the changed skyline as viewed from sensitive locations, during all stages of the project proposal.

The assessment should address the local visual impacts of the project proposal structures and associated infrastructure during construction, operation and post-mining, including final landform.

Land Contamination

This section should present the results of a preliminary site investigation (PSI) of the site consistent with the EPA's "Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland" to determine background contamination levels, including the following information:

- maps of areas listed on the Environmental Management Register or Contaminated Land Register under the *Environmental Protection Act 1994*;
- maps of any potentially contaminated sites not on the registers which may need remediation; and
- a description of the nature and extent of contamination at each site and a remediation plan and validation sampling.

3.1.2 Potential Impacts and Mitigation Measures

Land Use

The potential for the construction and operation of the project proposal to change existing and potential land-uses of the project site and adjacent areas should be detailed. Post-mining land-use options should be detailed including suitability of the area mined to be used for agriculture, industry, or nature conservation and the factors favouring or limiting the establishment of those options, should be given in the context of land-use suitability prior to the project proposal. Post-mining land-use options should be detailed in accordance with the objectives of the Environmental Management Policy for Mining in Queensland 1991 and based on a post-mine land suitability assessment. The land suitability assessment should follow the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995.

Land Disturbance

A strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final decommissioning should be described.

The methods to be used for the project proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. A description of the proposed final void landform/s post-mining (including dimensions) should also be provided.

Where dams and roads and other infrastructure are to be constructed, proposals for the management of these structures after the completion of the project proposal should be given. A contour map of the area should be provided (if relevant). Also, the final drainage and seepage control systems and any long term monitoring plans should be described.

Proposed decommissioning should be described, including consolidation, revegetation, fencing, and monitoring. Post-mine, long-term management of the levee on the Nogoa River floodplain should be discussed.

A description of topsoil management should outline how the utilisation of soil suitable for rehabilitation purposes will be maximised. Erosion and sediment control measures should be described, particularly in relation to the management of acidic, sodic and saline overburden material.

Land Contamination

The EIS should describe the possible contamination of land from aspects of the project proposal including waste material (including waste rock dumps), tailings and reject product generated from washing and processing coal at the coal handling and processing plant, and spills at chemical and fuel storage areas.

The means of preventing land contamination (within the meaning of the *Environmental Protection Act 1994*) should be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after project completion.

The potential acid forming characteristics of mine waste should be estimated and presented in the EIS. If any mine waste is identified as being potentially acid forming, management strategies for that waste should also be described in the EIS.

Transport

The EIS should provide sufficient information for the Department of Main Roads and Local government to make an independent assessment of how the State-controlled and Local government road networks respectively, will be affected using Main Roads' Guidelines for Assessment of Road Impacts of Development Proposals, with reference to the Road Planning and Design Manual. The EIS should include analysis of the potential impacts on the roads from construction and operational traffic associated with the project proposal.

The assessment of potential impacts should include:

- safety and efficiency impacts on roads;
- intersections from additional traffic associated with the project;
- a pavement impact assessment (if required);
- a potential need for increased road maintenance from hauling construction materials and components away; and
- proposed ways of dealing with any significant road impacts that are identified.

Sufficient information should also be provided to enable Queensland Rail to make an independent assessment of how the rail network (including infrastructure) will be affected. Information should also be provided on proposed emergency vehicle access to the project site.

Climate

The EIS should describe the air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) likely to affect air quality within the environs of the project proposal. Rainfall patterns, including magnitude and seasonal variability of rainfall, must be considered. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the project proposal site. The vulnerability of the area to natural or induced hazards, such as floods, bushfires and earthquakes should also be addressed. The relative frequency, magnitude and risk of these events should be considered.

3.2 WATER RESOURCES

3.2.1 Description of Environmental Values

Surface Water

A description should be given of the surface watercourses and their quality and quantity in the area affected by the project, with an outline of the significance of these waters to the river catchment system in which they occur, with particular reference to the draft Central Queensland Strategy for Sustainability. Details provided should include a description of existing surface drainage patterns and flows in major streams. A map or maps should be provided at a suitable scale depicting the nature of any aquatic features within or adjacent to the project site including wetlands, waterways, drainage channels, intermittent water features, dams, man-made channels etc.

Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the project. Flood studies should include a range of annual exceedance probabilities for affected waterways, where data permits.

Describe the environmental values of the surface waterways of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy and the Central Queensland Strategy for Sustainability;
- sustainability, including both quality and quantity;
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form; and
- any water resource plans, land and water management plans relevant to the affected catchments, including the Fitzroy Basin Natural Management Plan – Central Queensland Strategy for Sustainability.

Groundwater

The EIS should review the quality, quantity and significance of groundwater in the project proposal area, together with groundwater use in neighbouring areas.

The review should include a survey of existing groundwater supply facilities such as bores, wells, or excavations.

The EIS should include an assessment of local and regional groundwater resources. A description of existing groundwater usage, based on consultation with surrounding landholders, should be provided and should include details and location of surrounding residents using groundwater for drinking, stock watering or irrigation purposes.

Describe the environmental values of the underground waters of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy;
- sustainability, including both quality and quantity; and
- physical-chemical characteristics.

3.2.2 Potential Impacts and Mitigation Measures

Surface Water

An assessment should be made of the potential impact of the project on the flow and quality of surface waters, in the catchment area of the site. The assessment on flow of surface waters should include:

- The impacts of surface water flow on existing infrastructure, including access roads to the project site, with reference to the Environmental Protection (Water) Policy 1997. In particular, assessment of impacts on the flow and the quality of surface waters should include an assessment of the likely effects of any waterway barriers proposed in any watercourse or flood protection infrastructure proposed adjacent to any watercourse.
- The potential impacts of the proposed project on the integrity and stability of watercourses.
- The impacts on floodplain morphology.
- The impacts of flood protection infrastructure on local catchment hydrology, including water availability to downstream water users, and impacts on riparian vegetation and wetland ecology in the floodplain adjacent to the Nogoa River.
- The impacts of the project proposal on erosion of agricultural land and erosion of the post-mining landform under the proposed post-mining land-use.
- The impacts of levee construction on erosion and waterway realignment.
- Any changes to sediment drop both in waterways and on the floodplain due to any proposed changes in flow.
- Any changes to flood water velocity.
- Changes to frequency of flow events impacting on adjacent land-use.
- Velocity of flow events at sensitive locations on the floodplain.
- An assessment of the stability of any proposed flood protection infrastructure, the risk of failure of flood protection infrastructure and potential impacts arising from such failure.
- The impact of the final void landform/s on overland flow hydrology and associated impacts on riparian areas and aquatic ecosystems, both at the site and downstream of the project.

The assessment of impacts on the flow and the quality of surface waters should be reported with particular reference to their affects on environmental values for water, including the biological integrity of the aquatic ecosystem and agricultural, industrial and recreational uses.

The EIS report should provide details of:

- Flood potential and flood protection strategies based on flood modeling.
- How the water management system will conform to the relevant regional Water Resource Plan (WRP).
- Changes to the flow regime of surface waters resulting from the alteration of drainage networks and the extraction of water, if required.
- Water management storage and treatment facilities, including their capacity and location.
- Proposed uses of water management systems, if required.
- The chemical and physical properties of any waste water at the potential discharge point/s to natural surface waters.
- The effect of surface run-off, potentially containing elevated concentrations of suspended solids, and the effect of surface run-off potentially containing contaminants, from hazardous material storage sites, on local aquatic and terrestrial ecosystems, neighbouring properties and Nogoa River. The effect of surface runoff should be discussed in terms of the identified water quality values.

Management strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be protected.

In relation to water supply and usage, and wastewater disposal, the EIS should discuss anticipated flows of water to and from the project proposal area. Where dams, weirs or ponds are proposed, the EIS should investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the containing walls; and the quality of water contained, and flows and quality of water discharged. The design of all water storage facilities should follow the technical guidelines on site water management.

The need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000* should be discussed. Water allocation and water sources should be established in consultation with Department of Natural Resources and Mines. The Australian and New Zealand Environment and Conservation Council (ANZECC) 'National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters' (November 1992) and the Environmental Protection (Water) Policy 1997 should be used as references for evaluating the effects of various levels of contamination.

Groundwater

The EIS should include an assessment of the potential environmental harm caused by the project proposal to local groundwater resources. The impact assessment should define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the project proposal to groundwater depletion or recharge, groundwater quality, and subsequent impact to the floodplain and any aquatic features. Propose management options available

to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the project proposal should be described.

Details of the following should be provided when evaluating the potential impact of the project on the groundwater regime:

- chemical and physical properties of waste water (including leachate) that has the potential to enter the groundwater;
- control strategies for groundwater flow into mining pits;
- management strategies to dispose of groundwater that has entered the pit during the operational
- phase of the project;
- the likely quality of water in the final void, together with its use and management post-mining; and
- the potential to contaminate groundwater resources, including potential for contamination by hazardous materials, and measures to prevent, mitigate and remediate such contamination.

3.3 AIR

3.3.1 Description of Environmental Values

The function of this section is to describe the existing air environment which may be affected by the project proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and the Environmental Protection (Air) Policy 1997.

A description of the existing ambient air quality should be provided having regard for particulate matter, gaseous and odorous compounds.

The EIS should describe the air temperatures, wind (direction and speed) and any other special factors (e.g. temperature inversions) likely to affect air quality within the environs of the project proposal. Rainfall patterns including magnitude and seasonal variability of rainfall must be considered.

3.3.2 Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing environmental values for air, to describe how compliance with nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The objectives for air emissions should be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines, and any relevant legislation.

The proposed levels of emissions should be compared with the standards and goals contained in the Environmental Protection (Air) Policy.

The assessment of the project proposal's impact on air quality should consider the following matters:

- Features of the project proposal designed to suppress or minimise emissions, including dust, should be detailed.
- The proposed levels of emissions of dust, fumes and odours should include emissions during normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios, including the air emissions that may be generated as a result. The risk of nuisance to local inhabitants should be assessed.

Emissions should be modelled using a recognised atmospheric dispersion model. The limitations and accuracy of the applied atmospheric dispersion models should be discussed. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models.

Greenhouse Gas Abatement

A full assessment of greenhouse gas emissions from the project proposal should be provided including:

- an inventory of proposed future annual emissions for each greenhouse gas (including coal seam methane gas released during mining operations) and total emissions expressed in 'CO2 equivalent' terms for each component of the project proposal and for the combined total project proposal;
- the intended measures to avoid and minimise greenhouse emissions; and
- methodologies by which estimates were made.

Environmental management documents for the project proposal should include a specific module to address abatement of greenhouse emissions including at least:

- a listing of specific actions and commitments taken to avoid and minimise emissions;
- consideration of alternatives to the release of greenhouse gases to the atmosphere; and
- consideration of any additional voluntary initiatives consistent with the strategies outlined in the National Greenhouse Strategy or proposals undertaken as a component of the Commonwealth Greenhouse Challenge program.

3.4 WASTE

3.4.1 Description of Environmental Values

The function of this section is to describe the existing environmental values that may be affected by wastes from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection (Waste Management) Policy 2000. The proposals for waste avoidance, reuse, recycling, treatment and disposal should be described.

3.4.2 Potential Impacts and Mitigation Measures

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by wastes, to describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

Waste management issues should be identified for each phase of the project, including the following:

- planning and design – develop and implement strategies to avoid, reduce, reuse and/or recycle waste;
- pre-construction – identify potential wastes and develop and implement strategies for managing waste during the clearing of vegetation and earthworks;
- construction – identify and characterise major waste streams and determine waste avoidance/minimisation opportunities. Alternative methods for waste treatment, other than landfilling should be considered, and include re-use or recycling of materials and use of alternative materials; and
- operation – identify and characterise major waste streams during operation of the project and develop waste management strategies that include waste minimisation, re-use and/or recycling.

Proposals for off-site and on-site waste disposal should be described. The waste management strategies presented should have regard for the Environmental Protection (Waste Management) Policy 2000.

3.5 NOISE AND VIBRATION

3.5.1 Description of environmental values

The function of this section is to describe the existing environment values that may be affected by noise and vibration from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994*, the Environmental Protection (Noise) Policy 1997, and the Environmental Protection Regulation 1998.

The results of any baseline monitoring of noise and vibration in the proposed vicinity of the project proposal should be described. Baseline monitoring should include a selection of any sensitive areas affected by the project proposal. Sufficient data should be gathered to provide a baseline for later studies.

Monitoring methods should adhere to relevant Environmental Protection Agency Guidelines and relevant Standards, and any relevant requirements of the Environmental Protection (Noise) Policy 1997.

3.5.2 Potential Impacts and Mitigation Measures

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by noise and vibration, to describe how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed.

Anticipated noise levels from on-site construction, from the project site, and from project-related activities, such as traffic movements, should be included.

Information should be supplied on blasting that might cause ground vibration or fly rock on or adjacent to the site, with particular attention given to places of work or residence, recreation, worship and general amenity. The magnitude, duration and frequency of any vibration should be discussed. The impact of airblast overpressures from blasting should be estimated. Measures to manage environmental impacts, including nuisance, should be discussed.

3.6 NATURE CONSERVATION

3.6.1 Description of Environmental Values

The function of this section is to describe the existing environment values for nature conservation that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies, and the *Nature Conservation Act 1992.*

Describe the environmental values of nature conservation for the affected area in terms of:

- integrity of ecological processes, including habitats of rare and threatened species;
- conservation of resources;
- biological diversity, including habitats of rare and threatened species;
- integrity of landscapes and places including wilderness and similar natural places; and
- aquatic and terrestrial ecosystems.

A discussion should be presented on the nature conservation values of the areas likely to be affected by the project proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities, riparian zones, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at an appropriate scale and an assessment of the significance of native vegetation, from a local, regional and state perspective as identified in the Biodiversity Planning Assessment for the Brigalow Belt North.

A map should be provided at an appropriate scale depicting the nature of any aquatic features within or adjacent to the project site including wetlands, waterways, drainage channels, intermittent water features, dams, man-made channels etc.

The EIS should identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Areas of special sensitivity include any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding areas, and habitat of threatened plants, animals and communities. The project proposal's proximity to any biologically sensitive areas should be described.

Reference should be made to both State and Commonwealth 'endangered' species legislation and the EPA's guidelines for "Fauna and Flora Assessment in EIA".

Terrestrial Flora

The terrestrial vegetation communities within the affected areas should be described at an appropriate scale with mapping produced from aerial photographs and ground truthing. Sensitive or important vegetation types should be highlighted, including their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species should be specifically addressed. The surveys should include species structure, assemblage, diversity and abundance. Floristic information should also include:

- location and extent of vegetation types with a description of each community using a standard system according to Specht (1970), or Walker and Hopkins (1990), or Webb (1978) if rainforest;
- classification of vegetation types in accordance with the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- comparison of site mapping with mapping produced by the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- assessment of the habitat value of vegetation communities;
- assessment of the condition of vegetation communities and impacting or threatening processes; and
- identification of vegetation of conservation significance based on regional ecosystem status recognised by the EPA and status under the Vegetation Management Regulation 2000 and the *Environment Protection and Biodiversity Conservation Act 1999*, occurrence of species listed as rare, vulnerable or endangered under the Nature Conservation (Wildlife) Regulation 1994 and the *Environment Protection and Biodiversity Conservation Act 1999*, habitat value and condition.

Flora survey methodology should be stated and should be consistent with current best practice. The existence of important local and regional weed species should also be discussed.

Terrestrial Fauna

The terrestrial fauna occurring in the areas affected by the project proposal should be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. The conservation values of remnant vegetation and fauna habitat should be defined using principles

consistent with methodology used by the EPA. Fauna survey methodology should be stated and should be consistent with current best practice. Fauna survey should be carried out in all identified habitat types for the range of vertebrate species potentially occurring. Survey intensity and period should be consistent with the difficulty of locating species listed as rare, vulnerable or endangered under the Nature Conservation (Wildlife) Regulation 1994 or the *Environment Protection and Biodiversity Conservation Act 1999* that potentially occur in the area.

The description of the fauna present or likely to be present in the area should include:

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and bats;.
- any species that are poorly known, but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement;
- the existence of feral or exotic animals; and
- use of the area by migratory birds, nomadic birds, and terrestrial fauna.

The EIS should indicate how well any affected communities are represented and protected elsewhere in the province where the site of the project proposal occurs.

Aquatic Biology

The aquatic flora and fauna occurring in the areas affected by the project proposal should be described, noting the patterns and distribution in the waterways. The description of the flora and fauna present, or likely to be present in the area, should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways;
- aquatic plants;
- aquatic substrate and stream type; and
- downstream habitat.

Outline the suitability and effectiveness of the proposed buffer widths (ecological buffer between development and aquatic features) in terms of filtration, water treatment, and amelioration of bordering impacts, in order to preserve water quality and habitat within and adjacent to aquatic features.

Determine the fisheries values within the aquatic features both upstream and downstream of the project site.

3.6.1.1 Matters of National Environmental Significance

The Project has been declared a "Controlled Action" under the EPBC Act due to the potential impacts on Brigalow (*Acacia harpophylla*) communities. For these communities, the floristic information provided should include:

- location and extent of vegetation types with a description of each community;
- classification of vegetation types in accordance with the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- comparison of site mapping with mapping produced by the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- assessment of the habitat value of vegetation communities;
- assessment of the condition of vegetation communities and impacting or threatening processes.

3.6.2 Potential Impacts and Mitigation Measures

This section should discuss all likely direct and indirect environmental impacts on flora and fauna, particularly sensitive areas and species, including their long and short-term resilience to environmental change through the imposition of a levee or other works associated with the project. The potential impact of the project on aquatic features including wetlands, waterways, drainage channels and intermittent water features should be described. Also provide possible alternatives to any disturbance to the aquatic features identified above.

Details should be provided on the measures to be employed to avoid or mitigate damage occurring to 'of concern', 'endangered regional ecosystems', riparian areas and aquatic features.

Measures to mitigate the environmental harm to habitat or the inhibition of normal fauna movement, propagation or feeding patterns, and change to food chains should be described. Specific management measures to minimise the impact of additional traffic on all road networks associated with the mining operations on fauna movement should be detailed.

The provision of buffer zones and movement corridors, and strategies to minimise environmental harm on migratory, nomadic and aquatic animals should be discussed.

Weed control strategies aimed at containing existing weed species (e.g. parthenium and other noxious weeds) and ensuring no new invasive weeds are introduced to the area should be detailed in the EIS. Specific components of the weed control strategies should be outlined such as washdown procedures, education of onsite staff and reporting mechanisms during construction and operational phases.

Feral animal management strategies should be addressed. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Reference should be made to any relevant local government Pest Management Plan when determining control strategies.

3.6.2.1 Matters of National Environmental Significance

This section should discuss all likely direct and indirect environmental impacts on the Brigalow communities. Details should be provided on the measures to be employed to avoid or mitigate the impacts on these communities.

3.7 CULTURAL HERITAGE

3.7.1 Description of Environmental Values

The function of this section is to describe the existing environment values for cultural heritage that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies, the *Aboriginal Cultural Heritage Act 2003*, and the *Queensland Heritage Act 1992*.

A cultural heritage study will be required to describe indigenous and non indigenous cultural heritage sites and places, and their values. The studies will be conducted in accordance with the specific requirements of the above legislation, including the involvement of relevant Aboriginal groups.

3.7.2 Potential Impacts and Mitigation Measures

Strategies to mitigate the potential impacts on any sites or places of cultural or heritage significance within the project site and its vicinity, should be detailed in the EIS. The potential environmental impacts on cultural heritage values of the site and area in the vicinity of the project should be managed under a Cultural Heritage Management Plan (CHMP).

3.8 SOCIAL

3.8.1 Description of Environmental Values

The function of this section is to describe the existing social values that may be affected by the mining activities.

The amenity and use of the project site and adjacent areas for rural and agriculture purposes, should be described.

Consideration should be given to:

- community infrastructure and services, access and mobility;
- population and demographics of the affected community;
- local community values;
- current property markets and availability of accommodation;
- recreational, cultural, leisure and sporting facilities and activities in affected area.

- number of properties directly affected by the project; and
- number of families directly affected by the project, including not only property owners but families of workers either living on the property or workers where the property is their primary employment.

Through the public consultation and participation process, the EIS should identify both the positive and negative impacts (both direct and cumulative) of the project in its developmental and operational stages. The profile of the affected communities should be based on quantitative data (readily available) and qualitative data (which can be gained through the consultation process).

3.8.2 Potential Impacts and Mitigation Measures

The function of this section is to define and describe the social impacts of the project. The social impact assessment of the project should consider the project's impact, both beneficial and adverse, on the local community through the information gathered in the community consultation program and the analysis of the existing socio-economic environment.

Identify possible beneficial and adverse impacts (both direct and cumulative) on affected communities. These impacts should be considered both at the regional and local level during the construction and operational stages. Attention should be paid to:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land-uses and existing lifestyles and enterprises;
- impacts on local and state labour markets, with regard to the source of the workforce;
- impacts on local residents' values and aspirations;
- impact on existing services such as Emergency Services and general human and community services;
- availability of housing during construction and operation; and
- development of local community capacity initiatives in partnership with the local community.

Details should be provided on the following:

- housing and accommodation requirements for the construction and permanent workforce;
- standard of accommodation i.e. houses, hostels, caravan parks, existing houses, private boardings; and
- timing for provision of accommodation.

Details of housing and accommodation alternatives considered and the reasons for the preferred option should be detailed in the EIS. The proposed location of any additional housing and other accommodation facilities required for the project should be specified.

3.9 ECONOMY

3.9.1 Description of Environmental Values

The function of this section is to describe the existing economic environment that may be affected by the mining activities.

The character and basis of the local and regional economies should be described including:

- economic viability (including economic base and economic activity); and
- existing housing market, particularly rental accommodation which may be available for the project workforce.

3.9.2 Potential Impacts and Mitigation Measures

The function of this section is to define and describe the economic impacts of the project.

The analysis of general economic impacts of the project should include:

- the relative significance of the project in the local and regional economic context;
- the direct long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local and small business) impacts that are likely to result from implementation of the proposed development;
- implications for future development in the locality (including constraints on surrounding land-uses and existing industry);
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Attention should be focussed on the long and short-term direct effects of the project (including mine closure) on the regional income and employment and the State economy.

The effect on local labour markets should be discussed with regard to the source of the workforce. In relation to the source of the workforce, clarification is required as to whether the project proponents or contractors, are likely to employ locally or through other means and whether there are initiatives for local employment opportunities.

3.10 HEALTH AND SAFETY

The function of this section is to define and describe the objectives for protecting or enhancing health and safety community values. It should detail any impacts of the Project on the health and safety of the community, workforce, suppliers and other stakeholders, in terms of health, safety, and quality of

life from factors such as air emissions, dour, dust, pests, noise, waste and water. It should include details of:

- compliance with relevant Health & Safety legislation (eg. for the mine site – *Explosives Act 1999, Coal Mining Safety and Health Act 1999)*;
- security arrangements;
- compliance with food hygiene legislation should food be supplied on-site (ie. at construction camp);
- emergency plans and safety management strategies, as well as corroboration of the effectiveness of such systems;
- details of on-site emergency response capabilities (eg. on-site paramedic or first-aid officer), for both the construction and operational phases of the Project, which should include personnel trained for fire suppression and containment, rescue and first aid; and
- the risk assessment conclusions reached and the level of off-site risk from the proposed developments.

Measures to prevent combustion of in situ and stockpiled raw materials, products or process elements should be described. The need for any permit under the *Building Act 1975,* or any permit to store flammable and combustible liquids should be addressed. This section should provide a complete inventory for each class of substances listed in the "Australian Dangerous Goods Codes" to be held on-site. This information should be presented by classes and should contain:

- chemical name;
- concentration in raw material chemicals;
- concentration in operation storage tank;
- U.N. number;
- packaging group;
- correct shipping name; and
- maximum inventory of each substance.

Details should be provided of safeguards proposed on the storage, use, handling and on-site movement of the materials to be stored on-site. The capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to adversely impact upon the environment in the event of an accident should be described. The procedures to prevent spillages, and the emergency plans to manage hazardous situations should be described.

Any use of mining equipment, such as industrial gauges or soil/moisture density gauges, that are used or proposed to be used on the mine site and contain sealed radionuclide must be held under a licence issued under the *Radiation Safety Act 1999.*

In addition to on-site risks, the external risks of the Project should also be considered. Specifically, external risks to any bridge structures should be considered. External risks from natural hazards should be determined on the basis of "AS/NZA Risk Management Standard 4360:1999".

This section should present a hazard analysis for all aspects of the construction and operation of the Project where appropriate, including the industrial and transport components. The transport of any dangerous goods should be specifically addressed. Risk assessment should include consideration of maximum accidental spillage or emission of toxic or environmentally harmful material, potential impacts on human health and natural ecosystems, and appropriate management and mitigation strategies.

A preliminary hazard analysis should be conducted in accordance with the appropriate "Guidelines for Hazard Analysis" (e.g. HAZOP Guidelines, NSW Department of Planning Guidelines for Hazard Analysis). The assessment should outline the implications for, and the impact on, the surrounding land uses. The preliminary hazard analysis should incorporate:

- all relevant hazards (minor and major);
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- life of any identified hazards;
- a list of all hazardous substances to be used, stored, processed or produced;
- the rate of usage; and
- description of processes, type of the machinery and equipment used.

Where relevant, management plans should be prepared for any significant hazards in accordance with the relevant NSW Major Industrial Hazards Advisory Paper (MIHAP).

4.0 DRAFT EMOS

The project proponent will be required to submit a Draft EMOS with the EIS. The Draft EMOS will be prepared with reference to the EPA Guideline 8 "Preparation of an Environmental Management Overview Strategy".

The Draft EMOS will outline:

- the environmental values likely to be affected by the mining activities;
- the potential adverse and beneficial impacts of the mining activities on the environmental values;
- the environmental protection commitments to enhance the environmental values and mitigate potential environmental impacts that may be generated by the project, including monitoring programs to monitor the affects of the major environmental impacts identified in the EIS; and
- draft environmental authority conditions which will form the basis for the Environmental Authority application and licencing of the project under the Environmental Protection Act 1994.

The environmental protection commitments must address the requirements of Section 203(2) of the *Environmental Protection Act 1994.*

5.0 REFERENCES

The EIS should provide a list of all references consulted.

6.0 RECOMMENDED APPENDICES

A1. Final Terms of Reference for this EIS

A copy of the final TOR should be included in the EIS. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS should also be provided.

A2. Development Approvals

A list of the development approvals required by the project should be presented.

A3. EIS Study Team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

A4. Specialist Studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices.

A5. Glossary of Terms

A glossary of technical terms, acronyms and abbreviations should be provided.