



Australian Government

Department of the Environment, Water, Heritage and the Arts



Government of South Australia

Primary Industries and Resources SA

**Guidelines for Preparation of a Public
Environment Report (PER) under the
Australian Government *Environment
Protection and Biodiversity Conservation Act 1999*
and a Lease Proposal and Mining and Rehabilitation
Program (MARP) under the South Australian *Mining
Act, 1971***

Four Mile Uranium Mine EPBC 2008/4252



17 September 2008

***Approvals and Wildlife Division
Department of the Environment, Water, Heritage and the Arts***

***Minerals Group
Division of Minerals and Energy Resources PIRSA***

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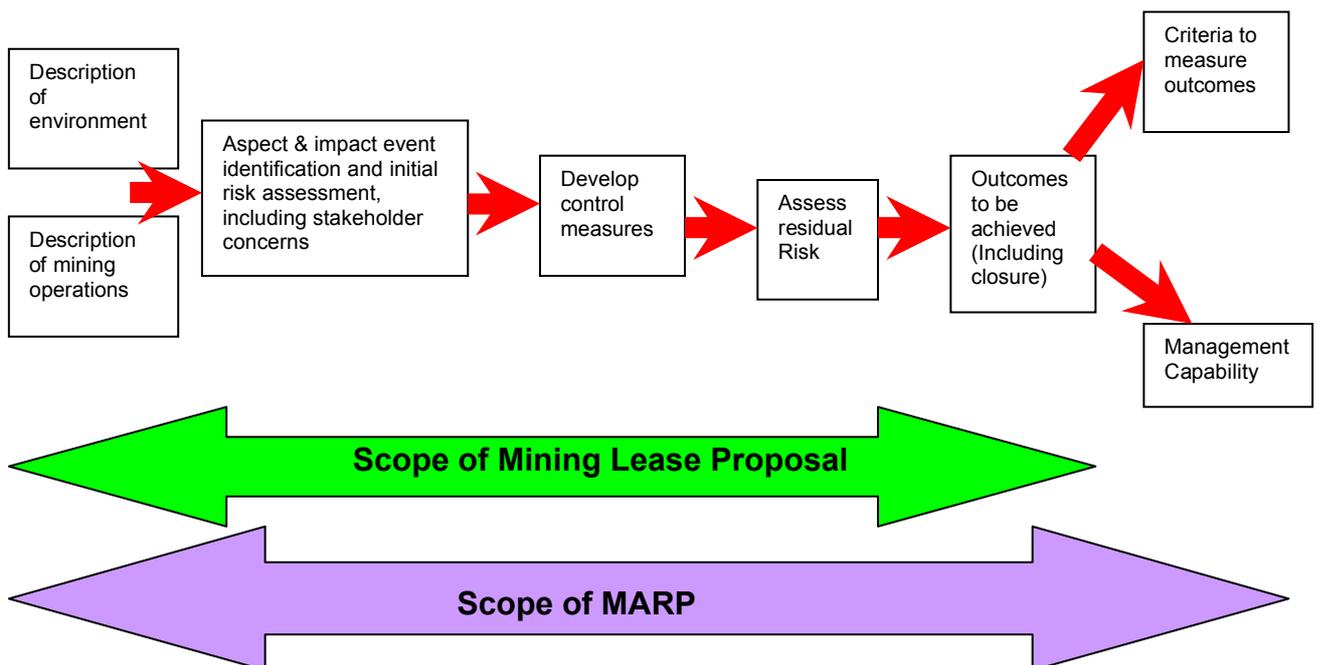
1. INTRODUCTION

This Guideline has been prepared by the South Australian Department of Primary Industries and Resources SA (PIRSA) and the Commonwealth Department of Environment, Water Heritage and the Arts (DEWHA) to guide the proponent to prepare a Public Environment Report (PER) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and a Mining Lease Proposal to support an application for a Mining Lease under the *SA Mining Act 1971*. It also provides guidance on preparing the MARP under the SA Mining Regulations, should a lease be granted.

The purpose of the **PER** or **Mining Lease Proposal** (hereafter referred to as the Proposal) is to facilitate consultation across a wide stakeholder base to identify the risks inherent in the Proposal, and propose a set of credible outcomes that are likely to be acceptable to the majority of stakeholders, and at least demonstrate a net public benefit if the Proposal were to proceed. The focus of the assessments under the EPBC Act and Mining Act will be to ensure appropriate environmental outcomes are developed, and these will form the basis of the approval conditions under the EPBC Act and the mining lease.

The purpose of the **MARP** is to demonstrate that the outcomes proposed as part of the lease application (and endorsed by the PIRSA by lease grant) can be achieved. More detail is required on control measures, the development of measurable criteria to demonstrate clear and unambiguous achievement of the outcomes, and to demonstrate the management capability of the mining operator.

The diagram below illustrates the conceptual assessment process required to be followed in developing the Mining Proposal and MARP and hence what is expected to be documented in each of these - this process is explained in more detail under section 8.1. The key differences between the content of the Mining Proposal and the MARP are highlighted (a detailed checklist of the differences is provided in Section 3 of this guideline):



Appendix 1 provides some definitions of terms used in this Guideline.

The PIRSA publication "*Mining Approvals in South Australia*" provides further explanation of the difference between the documentation required to support a mining lease application, and the MARP, and details on the South Australian legislative and policy context for these guidelines.

These guidelines are also designed to meet the requirements of Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000*. These requirements are contained in Appendix 3.

2. GENERAL PRINCIPLES FOR THE PREPARATION OF DOCUMENTS

The regulatory approach that underpins this guideline is a risk - performance based process and this should be considered when preparing the documents. The aim is to identify on an individual mine site basis the key environmental, social and economic risks associated with the proposal or mine, and to develop publicly acceptable outcomes that the proponent is prepared to deliver. The focus is on **what** should be achieved (outcomes) not **how** it should be achieved.

The most important principle that should be followed in preparing documentation is clarity. It should be understood that the Proposal or MARP may be read by a wide range of stakeholders with varying levels of understanding of environmental issues and mining operations. Clear presentation of complete information, free from industry jargon, will assist stakeholders in understanding your proposed or ongoing operation and allow meaningful comment.

The aim is to have documents that:

- Contain complete, relevant, accurate, balanced and concise information on the mining proposal, the surrounding environment, and the environmental, social and economic risks and benefits of the Proposal.
- Present information in a way that allows the person assessing the document to clearly understand how conclusions about risks have been reached, including assumptions made in developing models of environmental aspects and
- Where insufficient information has been included to fully understand risks, this is made clear and adequately justified.

The main text must largely stand alone as a summary of firm commitments or conclusions, and significant detail of commitments or conclusions should not be exclusively left to appendices.

Examples of approved mining lease proposals, MARPS and PIRSA assessment reports can be found on the mining environmental documents database on PIRSA's Minerals website (www.minerals.pir.sa.gov.au).

Other South Australian Government agencies that may need to be contacted as stakeholders in developing documentation, or to obtain other licences, approvals and permits, are listed in Section 10. Other approvals will also be required from Australian Government agencies.

Once approved, the operation must be managed in accordance with the EPBC Conditions, lease conditions and the MARP. A change in the operation (size, scope or mining techniques) or a new awareness of an aspect of the environment that significantly alters the environmental risks associated with the operation will require a revised MARP to be submitted for approval, and if significant, may require changes to existing EPBC or lease conditions (including a new round of public consultation).

The document (nor any attached consultant report) must not include a disclaimer on the reliability of information and conclusions in the document, nor assert copyright on making copies of the report. The lease applicant or leaseholder must take full responsibility for the content.

For all information provided, the document must state:

- (a) the source of the information;
- (b) how recent the information is;
- (c) how the reliability of the information was tested; and
- (d) what uncertainties (if any) are in the information.

3. CONTENT OF THE MINING LEASE PROPOSAL OR MINING AND REHABILITATION PROGRAM

NOTE: Refer to Appendix 3 for a list of the mandatory items required under Schedule 4 of the Environment Protection and Biodiversity Regulations 2000 (C'th). For other items the document submitted should include only those items relevant to the proposal.

Provided the requirements in the EPBC Regulations are met, the content of the PER is the same as that required for a Mining Lease Proposal.

Section	Proposal	MARP	Map/Plan required	Guidelines reference
Title page:	✓	✓		
Mineral Claim number or Tenement name(s) and number(s) of the mine	✓	✓		
Full name/s and postal addresses of the applicant or mine owner & Mine Operator and contact person	✓	✓		
Name of the mining operation	✓	✓		
Commodity to be mined	✓	✓		
Date of preparation of document	✓	✓		
Table of contents:	✓	✓		
The contents of all volumes showing section headings	✓	✓		
All figures, tables, plates, plans, maps and their sequential numbers and scales	✓	✓		
All appendices (with meaningful titles, including sub-appendices if any). If an appendix contains a collation of data (eg drillhole logs) then a summary of the contents of the appendix must be included	✓	✓		
Digital files submitted with the report should be listed with their name, file size and file type in the table of contents	✓	✓		6.3
Each subsequent volume to the first must have its own volume contents list	✓	✓		
Introduction/ Executive summary	✓	✓		
A general description of the mine and clear outline of the objective of the action	✓	✓		
Background to the Proposal	✓			
Summary of the land and environment description	✓	✓		
Summary of existing operations	If applicable	✓		
Summary of proposed operations,	✓	✓		
Key environmental impacts and management strategies	✓	✓		
Proposed post mine land use	✓	✓		
Mine closure and rehabilitation strategies	✓	✓		

Section	Proposal	MARP	Map/Plan required	Guidelines reference
Proposal details	✓	✓		
Mineral Claim number or Tenement type (ML, MPL) and number(s) and other existing associated tenements	✓	✓		
Name of the mining operation (eg "XYZ Mine")	✓	✓		
Location of the proposed operation	✓	✓	✓	5.1
Land Tenure (Freehold title/Perpetual lease/Pastoral lease/Crown land, Native Title owner or claimant group, easements, other mining tenements). Quote relevant Certificate of Land Title etc.	✓	✓	✓	
Name/s of the (proposed) Mine owner & Mine Operator and contact person address, contact numbers: phone, fax, mobile numbers	✓	✓		
District Council/Corporation	If applicable	If applicable		
Description of the environment	✓	✓		4
Local community	✓	✓		4.1
Land use	✓	✓	✓	4.2
Proximity to housing and infrastructure	✓	✓	✓	4.3
Amenity	✓	✓	✓	4.4
Noise, dust and air quality	✓	✓		4.5
Topography and landscape	✓	✓	✓	4.6
Climate	✓	✓		4.7
Geohazards	✓	✓	✓	4.8
Hydrology	✓	✓	✓	4.9
Groundwater	✓	✓	✓	4.10
Vegetation, weeds and plant pathogens	✓	✓		4.11
Fauna	✓	✓	✓	4.12
Topsoil and subsoil	✓	✓	✓	4.13
Heritage	✓	✓		4.14
Proximity to conservation areas	If applicable	If applicable	✓	4.15
Pre-existing site contamination and disturbance	✓	✓	✓	4.16
Description of the operation	✓	✓		5
General description	✓	✓		5.1
Background to the development and how the action relates to any other actions				5.1
Precise location of the proposed operation; direction and distance from the nearest town	✓	✓	✓	5.1
The current status of the action				5.1
Any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action.				5.1
Feasible alternatives to the action				5.1.1

Section	Proposal	MARP	Map/Plan required	Guidelines reference
Ore reserves and market	✓	✓		5.2
Geological environment	✓	✓	✓	5.2.1
Reserves and resources	✓	✓	✓	5.2.2
Market	✓	✓		5.2.3
Radioactive substances and ores	If applicable	If applicable		5.2.4
Mining Operations	✓	✓		5.3
Type or types of mining operation to be carried out	✓	✓		5.3.1
Sequence of operation	Conceptual	Specific	✓	5.3.2
Modes and hours of operation	✓	✓		5.3.3
Use/storage of explosives	If applicable	If applicable	✓	5.3.4
Underground ventilation systems and raise bores	If applicable	If applicable	✓	5.3.5
Underground Fill	If applicable	If applicable	✓	5.3.6
Type of equipment	Conceptual	Specific		5.3.7
Ore Haulage and stockpiles				5.4
Stockpiles	✓	✓	✓	5.4.1
Modes and hours of operation	✓	✓		5.4.2
Type of equipment	Conceptual	Specific		5.4.3
Crushing and Processing	✓	✓		5.5
Crushing Plant	Conceptual	Specific	✓	5.5.1
Processing Plant	If applicable	If applicable	✓	5.5.2
Modes and hours of operation	✓	✓		5.5.3
Type of equipment	Conceptual	Specific		5.5.4
Wastes	✓	✓		5.6
Mine Wastes	✓	✓	✓	5.6.1
Processing wastes	If applicable	If applicable	✓	5.6.2
Industrial and Domestic Waste	✓	✓	✓	5.6.3
Silt Control and drainage	✓	✓	✓	5.6.4
Supporting surface infrastructure	✓	✓		5.7
Access	✓	✓	✓	5.7.1
Accommodation and offices	✓	✓	✓	5.7.2
Public roads, services and utilities to be used	✓	✓	✓	5.7.3
Visual screening and site security	Conceptual	Specific	✓	5.7.4
Resource Inputs	✓	✓		5.8
Workforce	✓	✓		5.8.1
Energy sources	✓	✓		5.8.2
Water sources	✓	✓	✓	5.8.3
Description of Benefits	✓			6
Social	✓			6.1
Economic	✓			6.2
Environmental	✓			6.3
Stakeholder consultation	✓	✓		7
Identification of affected parties and a description of their views.				

Section	Proposal	MARP	Map/Plan required	Guidelines reference
Details of any consultation, undertaken and/or proposed				
<i>For each stakeholder consulted:</i>				
Name of stakeholder or group	✓	✓		
Type of stakeholder (resident, council etc)	✓	✓		
Issues raised	✓	✓		
Response	✓	✓		
Environmental, social and economic aspects	✓	✓		8
<i>For each Environmental, Social or Economic aspect:</i>				
Context & stakeholder views	✓	✓		8.3
Applicable legislation or standards	✓	✓		8.4
Potential impact events	✓	✓		8.5
Control and management strategies	Conceptual	Specific	As required	8.6
Likelihood and severity of consequence, risk	✓	✓		8.7
Risk acceptance	✓	✓		8.8
Outcomes	✓	✓		8.9
Outcome measurement criteria	Conceptual	Specific	As required	8.10
Leading Indicator criteria	Conceptual	Specific	As required	8.11
Company compliance monitoring plan	Conceptual	Specific	As required	8.12
Ongoing Community Engagement Plan	Conceptual	Specific		8.13
Mine closure and rehabilitation plan	✓	✓		9
Baseline Data and context	✓	✓		9.2
Stakeholder Involvement and issues (inclusive of identification)	✓	✓		9.3
<i>For each closure domain:</i>				
Scope of domain	✓	✓	✓	9.4
Potential environmental and social impacts of closure	✓	✓		9.5
General Standards	✓	✓		9.6
Closure Outcomes and criteria	✓	✓		9.7
Sustainable closure strategy	✓	✓		9.8
Closure Plan maps and sections	✓	✓	✓	9.9
Residual Risk Assessment	✓	✓		9.10
Closure Cost estimate (spreadsheet model)		✓		9.11
Contingency provision		✓		9.12
Provision for funding of rehabilitation		✓		9.13
Mine Closure schedule		✓		9.14
Management capability		✓		10
Management commitment		✓		10.1
Procedures		✓		10.2
Risk management		✓		10.3
Compliance monitoring		✓		10.4
Non-compliance response plans		✓		10.5

Section	Proposal	MARP	Map/Plan required	Guidelines reference
System review		✓		10.6
External communications				10.7
Employee Induction training and supervision		✓		10.8
Structure, responsibility and resources		✓		10.9
Previous experience and details of any proceedings under Commonwealth or State law for the protection of the environment	✓	✓		10.10
Lease conditions		✓		10.11
References	✓	✓		
Appendices	✓	✓		

The following sections provide detailed guidance on the information required under each section for either the Proposal or MARP.

4. DESCRIPTION OF THE NATURAL, SOCIAL AND ECONOMIC ENVIRONMENT

In this section, information is required on the general natural physical, biological, social, economic, and cultural environment of the proposed area and the surrounding region that may be affected by the mining operation. This information is necessary to assess the direct and indirect impacts, as well as the short and long term impacts, the proposed operation may have on the physical environment, well being and amenity values of the public; it provides a context for the rest of the document.

Depending on the significance of the environmental aspect, the extent of existing information and the potential risks to those particular aspects of the environment, the level of qualitative detail and baseline environmental data required is similar for both a Proposal and a MARP. The document should include as minimum the spatial layout of the immediate and surrounding landscape features. Quantitative baseline data required in MARP should be sufficient to provide a basis for proposed measurement criteria, particularly closure criteria.

The process should aim to ensure that all aspects of the environment and stakeholder interests are identified so that the potential impacts of the proposed operation can be fully assessed. While PIRSA may be able to provide broad guidance and advice regarding this requirement, it is your judgement as to how much detail will be required in describing the existing environment, based on your knowledge of the proposed operation and any issues or risks arising from the engagement with stakeholders. The lease application is more likely to proceed smoothly and suffer less delay if an appropriate level of stakeholder engagement has been undertaken at an early stage to ensure that all issues have been addressed in the proposal prior to the statutory consultation.

The document should include a location plan that shows the application area in a regional context showing the:

- Claim/lease/licence boundaries, including adjoining tenements.
- Regional air photo background
- Regional drainage
- Location of existing roads, railways, transmission lines, towns, pipelines
- Location and extent of any adjacent conservation reserves, heritage sites or any other environmentally significant areas.

NOTE: The following topics are only provided as a starting point and a guide to assist you prepare your description of the environmental, social and economic aspects of your Proposal or MARP. These should not be taken as limited to these or as requiring all of these in every circumstance:

4.1 Local Community

Summarise key aspects of the local communities that may be positively or negatively impacted by the mine in both the short and long term. This should include population, the local economy, (eg wheat, tourism, rural services), demographics (age, cultural backgrounds, educational qualifications, average income), local services and employment. Information on local area demographics may be obtained from Planning SA or the local council.

Potential stakeholders include the local council (or Outback Areas Community Development Trust, if outside of local council areas), Planning SA, and local residents and businesses.

4.2 Land use

Describe the land use (historical, current and potential) for the lease (or application) area and the surrounding areas (up to 5kms) from the proposed mine. The existing (or proposed if known) planning restrictions and guidelines for the land should be described. This should include State and Local Government Planning instruments including Council Development Plans and Out Of Councils situations. Known plans for future land use changes by other parties (e.g. conversion of farmland to residential) and the proposed land use post mining should also be included. Productive capacity or value of the land and associated resources should also be considered.

The Woomera Protected area may apply to some mining proposals, and permission must be obtained from the Department of Defence to open a mine in this area.

Potential stakeholders include the local council (or Outback Areas Community Development Trust, if outside of local council areas), Planning SA, Department of Defence (Woomera Protected Area) immediate and adjacent landholders (including the relevant government department for Crown land) and owners of infrastructure easements.

A map may be required to support this section.

4.3 Proximity to infrastructure and housing

Information is required to determine if existing infrastructure (both public and private) may be affected by the operation, and to determine the extent of impact on the public from noise/dust etc. Information and maps of relating to residences near to the mine area and other human infrastructure such as schools, hospitals, commercial or industrial sites, roads, sheds, bores, dams, ruins, pumps, scenic lookouts, roads, railway lines, fences, transmission lines, gas and water pipelines, telephone lines etc should be considered where relevant.

Potential stakeholders include the local council, Planning SA, Transport SA, immediate and adjacent landholders (including the relevant government department for Crown land) and owners of infrastructure easements.

A map is required to support this section.

4.4 Amenity

Describe any areas regarded by local communities or others as being of scenic or aesthetic value. This may include caves or karst features.

Potential stakeholders include the local council (or Outback Areas Community Development Trust, if outside of local council areas), Planning SA, and local residents.

A map may be required to support this section.

4.5 Noise, dust, air quality

Summarise the existing levels of dust, noise and contributors to air quality (both natural and industrial)

4.6 Topography and landscape

Describe and map the topography of the general area as well as the lease and surrounding areas. The presence of caves in karst (limestone) areas should be considered and a survey for the presence of caves may be required.

Potential stakeholders include the local council, local District Ranger (if located in or adjacent to a reserve), Planning SA, the immediate and adjacent landholders, the general public (public amenity issues) and (if applicable), the Cave Exploration Group of South Australia.

A map is required to support this section.

4.7 Climate

Summarise rainfall and temperature patterns, wind directions and speed (for dust impacts). This data may be derived from the nearest meteorological station. If relevant to the specific mine design, also include other meteorological events that may impact on your operation such as evaporation rates, high winds, flood events, frost events, maximum rainfall events (duration/magnitude) etc.

Climate change impacts should also be considered, particularly for long term projects

4.8 Geohazards

Potential natural geohazards may be:

- Structural instability (slips, faults, karst features or geological unit boundaries)
- Minerals hazardous to human health (eg radioactive minerals, asbestos),
- Minerals that may pollute the environment (eg sulphide minerals that may generate acid in waste material).

Maximum historic seismic events and frequency should be considered if significant plant or other structures are to be constructed.

Pre-operational monitoring is required to determine background levels of radionuclides in the environment. These measurements are required to ensure that the mining operation does not significantly increase exposure of the environment to radiation as a result of mining activities. It is important that the program commence early enough (generally 12 months prior) to allow seasonal variations in pre-existing conditions to be evaluated.

Potential stakeholders include the Radiation Protection Division of the EPA, landholders, immediate and adjacent landholders, *special interest community groups and the general public*.

A map may be required to support this section (e.g. map of existing radionuclide distribution).

4.9 Hydrology

Describe the current drainage patterns including the location of creeks, rivers, drains and dams and the direction of drainage. Indicate the ultimate downstream outfalls of creeks. Indicate if watercourses are permanent or ephemeral (i.e. usually dry and only run after significant rainfall). Consider if the area is within water protection areas including areas under the *River Murray Act*. Provide any baseline information on surface water quantity and quality.

Potential stakeholders include landholders using water from creeks in the area, the relevant NRM Board and the Department of Water, Land and Biodiversity Conservation.

A map is required to support this section.

4.10 Groundwater

This section should include an overview of the regional and local geology, hydrogeology and groundwater dynamics (flow directions, relative pressures/levels, interconnection, quality, size and key processes) as well as detail on aquifers that may be affected by the proposed operation.

For each aquifer that may be affected by mining operations (e.g. proposed mining aquifer, disposal aquifer, water supply aquifer) provide accurate detail of water quality and pressure, recharge areas, aquitards, aquifer details, water gradient (include seasonal fluctuations if known) flow directions/rates and discharge areas. Detail is also required on the level of connectivity between the mining and disposal aquifers and lateral, overlying or underlying aquifers and surface water (including areas remote from the mining site if relevant).

Include a description of the present water quality and current or potential use of this water by the landowner (e.g. stock use) and environment (e.g. natural springs), both in the proposed mining area and areas remote from the mining site that may be affected by the operation, taking into account the natural flow directions/flow rate of the aquifer. Consider if the area is within a water protection area or if it is a prescribed water resource under the NRM Act.

Potential stakeholders include the landholders using bores in the areas, the relevant NRM Board and the Department of Water, Land and Biodiversity Conservation.

Maps and cross sections, both regional and detailed are required to support this section.

4.11 Vegetation/Weeds/Plant Pathogens

Describe and map the existing flora on the proposed mine site and surrounding area (native and introduced). Include items such as floristic associations, conservation status and habitat value.

Describe and map the extent of the area affected or potentially affected by pathogens and weeds (e.g. *Phytophthora* or Broomrape) should be determined.

A history of land use may assist in providing some context to the existing vegetation. Is the existing native vegetation the result of deliberate cultivation (e.g. planting of native pasture grasses), or is it natural regrowth arising from previous clearance?

A vegetation survey undertaken by a suitably qualified person may be required if areas of remnant native vegetation are proposed to be cleared or impacted on by the proposed mining activity. The survey should include a description of the dominant vegetation communities (e.g. blue gum woodland), including a list of the common species of trees, shrub layer species, understorey species, groundcovers, grasses and identification of weed species and their extent of infestation. The survey must identify the presence of any listed threatened flora species under State and Commonwealth legislation.

Where clearing of the native vegetation is proposed, the Proposal or MARP should also include panoramic photographs of the site showing all vegetation types and a plan of the proposed lease location showing:

- the extent of the proposed vegetation clearance,
- proximity to all other native vegetation up to a 5km radius from the proposed mining site,
- the number of "scattered trees", "significant trees" or area (in hectares) of vegetation to be cleared,
- height and size of the dominant vegetation layer,
- density and age of the vegetation i.e. re-growth, mature or "old growth",
- health of vegetation e.g. previous disturbances such as clearing, grazing, thinning, logging, burning, existence of weeds, feral animals or disease,
- presence of any tree hollows or other habitat values and
- the likelihood of the presence of threatened flora..

Potential stakeholders include the landholder, Department for Environment and Heritage (SA), Department of the Environment, Water, Heritage and the Arts (Commonwealth), special interest community groups, and Native Vegetation Group (Department of Water, Land and Biodiversity Conservation, and the relevant NRM Board.

Maps and aerial photographs are required to support this section.

NOTE: Clearance, in relation to the *Native Vegetation Act (SA)*, means:

- The killing or destruction of native vegetation
- The removal of native vegetation
- The severing of branches, limbs, stems or trunks of native vegetation
- The burning of native vegetation, and
- Any other substantial damage to native vegetation, including the draining or flooding of land, or any other act or activity, that causes the killing or destruction

of native vegetation, the severing of branches, limbs, stems or trunks of native vegetation or any other substantial damage to native vegetation.

Generally speaking the damage to vegetation must be substantial rather than trivial in nature, however damage to a single tree may be enough to be considered "clearance".

Clearance of intentionally re-vegetated Land:

In some circumstances operators may need to re-clear land that has previously been intentionally re-vegetated with native vegetation e.g. as part of a lease condition. SEB will not be required for the clearance of that vegetation as long as it has not been planted as a condition to consent to clearance granted under Native Vegetation Act, or as an order of a court under the Native Vegetation Act.

Clearance of vegetation for rehabilitation purposes

If an operator requires the clearance of vegetation in order to undertake rehabilitation activities e.g. clearing native vegetation as part of the process to batter down a quarry face, then SEB will be required for the removal of that vegetation as that clearance is part of the overall operations.

Clearance of natural re-growth native vegetation

SEB requirements will still apply where a proponent wishes to clear native vegetation that has naturally re-established itself after clearance or grazing activities.

Refer PIRSA/DWLBC Guideline – Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the clearance of native vegetation clearance associated with the minerals and petroleum industry (September, 2005).

4.12 Fauna

Identify all native and introduced fauna currently in the area, noting conservation status of all species eg endangered, threatened, feral, domestic pets, livestock etc. It may be necessary to undertake a fauna survey by a suitably qualified person, particularly if native vegetation is proposed to be cleared.

Potential stakeholders include the Department of Environment and Heritage (SA), Department of the Environment, Water, Heritage and the Arts (Commonwealth), and special interest community groups.

A map may be required to support this section.

4.13 Topsoil and subsoil

Describe and map the profile (type and depth) and the characteristics (e.g. cracking clays, light red soils, red/brown earth - including productivity) of all soils on the proposed mine site. Identify any soil aspects that may be an issue for disturbance or rehabilitation (e.g. acid sulphate, saline, non-wettable etc)

Potential stakeholders include PIRSA, landowners and the relevant NRM Board.

A map is required to support this section.

4.14 Heritage (Aboriginal, European, Geological)

Details should be given of known Aboriginal or European cultural or archaeological sites, objects or remains. It may be necessary to undertake a heritage survey by a

suitably qualified person. Some rock formations contain fossils that may be regarded as of significant scientific value. Some geological features such as volcanoes or caves are also protected under heritage legislation.

Potential stakeholders include the Department of Aboriginal Affairs and Reconciliation, the Department of Environment and Heritage (SA), Department of the Environment, Water, Heritage and the Arts (Commonwealth), the South Australian Museum, Native Title owners & claimants, the Aboriginal Legal Rights Movement and local Aboriginal associations.

Refer MESA Information Sheet M29 – Aboriginal Heritage Act, 1988 and Aboriginal Site Avoidance Guidelines, particularly with respect to confidentiality issues.

Aboriginal heritage sites should not be included on maps, however European heritage sites should be included to support this section.

4.15 Proximity to conservation areas

Impacts on areas such as national parks, private conservation areas, heritage agreement areas and geological monuments should be considered. Consideration needs to be given to the likelihood that the proposed mine site acts as a linkage/habitat corridor to other nearby habitat areas, whether or not those areas are currently protected.

Potential stakeholders include the Department of Environment and Heritage (SA), Department of the Environment, Water, Heritage and the Arts (Commonwealth), special interest community groups, local councils, Native Vegetation Council, Department of Water, Land and Biodiversity Conservation and the Geological Society of Australia Inc.

A map may be required to support this section.

4.16 Pre-existing site contamination and previous disturbance

Details should be given of any known contamination of the site and of any disturbance by previous mining operations or other activities. Provide baseline soil physio-chemical properties of the site.

A detailed plan and cross-sections may be required to support this section.

5 DESCRIPTION OF THE OPERATION

A detailed description of the activities and infrastructure planned for the mine are required for both a Proposal and MARP. For a Proposal, this description may be more conceptual, but must include details about mining method, size and location of infrastructure and processing methodology. If significant changes to the proposed mining operation are required after the lease is granted, further formal public consultation may be required to change lease conditions, resulting in delays to the project. If the final mining and processing concepts have not been finalised, it may be possible to present alternatives in the Proposal.

5.1 Description summary and location of the operation

- Background to the development of the action
- Description and maps of the overall operation including the location of the proposed operation; direction and distance from the nearest town
- Description and the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts
- Description and maps of the overall area to be impacted by the operation (total environmental ground footprint)
- How the action relates to any other actions that have been, or are being, taken or that have been approved in the region affected by the action
- The current status of the action
- Detail any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action

5.1.1 Consideration of Alternatives

Provide details of any feasible alternatives to the action, including:

- If relevant, the alternative of taking no action
- A comparative description of the impacts of each alternative on the environment
- Sufficient detail to make clear why any alternative is preferred to another

5.2 Ore Reserves and Market

5.2.1 Geological environment

Provide a general description of mine site geology including:

- Location, dimensions and attitude of known ore bodies
- Potential extensions/ other ore bodies, prospective areas
- Ore composition
- Description and results of any exploration work carried out
- Typical cross-sections and maps.

5.2.2 Reserves and resources

- Current published reserve estimates (Australasian Joint Ore Reserves Committee compliant — see www.jorc.org)
- Known resources or potential for resources in lease area above known reserves

5.2.3 Market

Note: Some of the information in this section may be held confidential if required.

- Mine gate product (ie Uranium impregnated Resin or U₃O₈)
- Mining, production and sales rates
- Product to be marketed
- Intended market for the product and evidence that material can be economically mined and legally sold into this market.

5.3 Mining Operations

5.3.1 Overview of mining operation to be carried out

Provide general information on the mining operation to be carried out, such as:

- In situ recovery (ISR) technique
- The types of chemical beneficiation that will be undertaken
- Ongoing exploration or resource drilling.

5.3.3 Sequence of operation

The following information on the sequence of operations must be provided:

- Indication of initial production well field, disposal wells and subsequent production and disposal wells
- Planned commencement date of operations
- Timing and description of progressive work stages
- Proposed scheduling of progressive rehabilitation
- Estimated production schedules
- Estimated annual production of uranium product
- Expected mine life, including scope for extension

Maps or plans must be included to support this section.

5.3.4 Modes and hours of operation

Provide information on the modes and hours of operation to be carried out such as:

- Whether mining/processing would be worked continuously or periodically? (e.g. 24 hours/7days a week operation or only limited hours/days).
- Actual proposed hours of mining (e.g. from 7.00 am until 5.00 pm; consider week days, weekends and public holidays).
- Fly-in, fly-out operation or residential

5.3.8 Type of field equipment

Describe the equipment to be used in the well fields in terms of:

- Type, size and capacity of machines
- Noise, vibration and exhaust outputs
- Ignition sources (e.g. exhausts)
- Approximate number of units (this may include drilling rigs, geophysical logging units, water sampling/recovery/airlift trucks, track construction/rehabilitation vehicles, fire trucks etc)

5.3.9 Well construction

Describe the standard design and construction techniques proposed for:

- Injection wells
- Production wells
- Disposal wells
- Water supply wells
- Monitor wells

5.3.10 Well Houses

Describe the standard design and construction techniques proposed for well houses, including pumps, pressure monitoring etc.

5.3.11 Pipelines

Describe the standard design and construction techniques (including QA processes) proposed for :

- Trunk lines
- Gathering lines
- Waste disposal lines

5.4 Processing

The following information must be provided on the specifications of the processing plant:

- Process diagram showing the chemical inputs and process steps from mining to waste and product generation
- Type of product to be exported from the lease e.g. resin
- Area, size, physical components, type of construction and location of processing plant and associated structures (liquor ponds, evaporation ponds, concrete batching plant, wheel wash facilities, silos, fuel tanks, water tanks, chemical storage, RO plants, etc.) to be used for uranium extraction and processing on site
- Describe the nature of the chemicals to be used and their reactions with ore and processing water
- Mining solution composition
- Waste solution composition
- If processing water is to be used, provide a water balance and approximate water volumes required
- A water balance with consideration of any purge requirements
- Heat duties in MW for all drying, calcining or other heating operations in the plant
- A mass balance for the plant
- Noise sources
- Dust sources and composition
- Radon sources and volumes
- Ignition sources
- Other potential air emissions (including odour) and their composition

Note: EPA licences and authorisations will be required for the construction and operation of well-fields and processing plants.

Maps/construction plans must be included to support this section.

5.5 Wastes

5.5.1 Drilling wastes

Information must be provided on

- Likely composition of cuttings, including any radionuclide content
- Likely volumes of cuttings generated at each well
- How drilling cuttings wastes will be managed and disposed of

5.5.1 Low level solid radioactive (LLR) wastes

The following information must be provided on disposal of low-level radioactive wastes:

- Location, size, shape and depth of permanent and temporary LLR waste storage facilities
- Types of materials likely to be disposed of in the facility
- Type and thickness of liners
- Type of base
- Proposed capping methods
- Proposed method of monitoring for leachate

Note that all LLR waste facilities are required to be constructed to EPA requirements.

A map/construction plan must be included to support this section.

5.5.2 Liquid Processing wastes

The following information must be provided on the liquid processing wastes generated:

- Method of disposal (injection into aquifer or evaporation)
- Location of disposal wells or evaporation ponds
- If aquifer disposal is proposed, the estimated capacity and disposal rates
- If evaporation, estimated evaporation rates
- Construction details for evaporation ponds
- Estimated volumes of liquid processing wastes
- Composition of liquid wastes

5.5.3 Industrial and domestic wastes

- Information must be provided on the types and quantities of industrial and domestic wastes generated, and the methods of disposal

Wastes types include:

- Putrescible waste
- Oil
- Brine from reverse osmosis (RO) plants

- Workshop waste, tyres, drums,
- Waste from chemical/fuel spills

Where on-site burial is proposed, detail must be provided on size, location and construction details of disposal cells. A description must also state the type, area and layout of sewage systems to be installed at the site, and if the system has been approved (or will be approved) by the relevant authority.

A map/construction plan is required to be included to support this section.

Note: The method of disposal for wastewater (not from industrial processes) must comply with the "Standard for the Construction, Installation and Operation of Septic Tank Systems in SA" or be to the satisfaction of the Department of Health. Prior to installing a septic tank system it is mandatory to submit an application to and receive approval from the local council in the area in which the system is to be installed, or the Department of Health for areas of the State not under local government control.

5.5.4 Silt control and drainage

The following information must be provided on silt control and drainage:

- Location and design of silt management structures (e.g. silt retention dams) a
- Run off control on disturbed and rehabilitated areas
- Storage, diversion and disposal of clean water. (Discharge water must comply with the applicable EPA water policy)

Note that certified engineering and geo-technical design may be required for silt retention structures (if considered necessary).

A plan showing the surface water movement for the whole mine site must be included to support this section.

5.6 Supporting surface infrastructure

5.6.1 Access

The following information must be provided on mine site access:

- Describe the proposed access route to the site
- Indicate if any new roads are to be constructed or if existing roads are to be upgraded
- Airport/airstrips to be constructed

A map must be included to support this section.

5.6.2 Accommodation and offices

The following information must be provided on mine site personnel accommodation and offices:

- Number, area, size, type of construction and location of accommodation buildings or camp, and associated structures (e.g. car parks, office buildings water tanks, RO plants etc.) to be used for processing the minerals on site

5.6.3 Public roads, Services and utilities used by the operation

The following information must be provided on public roads, services and utilities to be used to support the mining operation:

- A description of the sources of external services that are to be supplied to the mine such as power, water, telephones etc.
- If new connections to public infrastructure are required, the proposed routes for connection
- A description of and the effects to any existing surface infrastructure that may be affected by the proposed mining operations
- Public roads to be upgraded or constructed and the transport system(s) used to and from the mine including details on the estimated number of vehicle movements per day

A map must be included to support this section.

5.6.4 Visual Screening and site security

The following information must be provided on visual screening and site security:

- Describe any proposed vegetation (i.e. species and density of plantings) or other type of screening
- Provide a general description of infrastructure and measures that will be adopted to prevent unauthorised access by the public including, fencing, signage, etc.

A map must be included to support this section.

5.7 Resource inputs

5.7.1 Workforce

The following information must be provided on the proposed workforce:

- Number and workforce breakdown by job type (e.g. operators, maintenance etc)
- Source of employees

5.7.2 Energy sources

The following information must be provided on energy sources and usage:

- Estimates of total annual energy usage from all sources, including personnel transport and ore transport to point of sale
- Expected sources of energy (e.g. coal fired electricity, gas fired electricity, diesel, wind etc)
- Potential for efficiency gains
- Amount and percentage of zero emission energy to be utilised
- Equivalent annual CO₂ generated.
- Any carbon offsets proposed
- Note: an EPA license may be required for fuel burning if onsite power generation is undertaken

5.7.3 Water sources

The following information must be provided on the source(s) of water to be used at the mine, expected usage and any discharge:

- Expected annual water usage by source (e.g. local groundwater, waste water, rainwater)
- Indicate if any water usage by source will be more than 5% of the total annual water withdrawal for that source
- Percent of water that will be recycled
- Water discharge by quality and destination

6 DESCRIPTION OF POTENTIAL BENEFITS

This information is not required for MARP reviews, but is required for all new mining lease proposals.

6.1 Social:

- Number of full-time employee positions to be directly created by the Proposal (not to include existing positions)
- If the operation is fly-in–fly-out, or local community based
- Source of the new labour (e.g. sourced from existing regional communities, South Australia or interstate/overseas)
- Any programs to target and assist indigenous or local employment at the mine
- Training to be provided to employees and potential employees
- Approximate timelines for creation of the positions
- Assistance or provision of infrastructure to isolated communities (e.g. provision of grid electricity to isolated communities, provision of an airstrip, medical facilities, etc.)
- Public health benefits (e.g. clean water to an Aboriginal community)
- Addressing local unemployment
- Tourism or recreation opportunities.

6.2 Economic

- Revenue to be generated
- Full breakdown of operating expenditures between local community, State and external to state
- Wages and other employee benefits
- Total value of land acquisition or other landholder compensation
- Potential for value adding of a mined commodity and flow on economic effects
- Economic benefits derived from local employment and local suppliers of material or services
- Potential to bring forward development of other mines in the area by utilising this mine's infrastructure
- Approximate royalty payments and other direct state government taxes profile
- Value of South Australian government financial benefits e.g. royalty reductions, assistance with infrastructure, exploration (PACE) assistance

6.3 Environmental

- Voluntary, non-core environmental benefits associated with the Proposal (e.g. removal of stock from a pastoral lease, capping of existing free-flowing bores)
- Acquisition of new baseline environmental data
- Potential benefits associated with the Proposal (e.g. restoration of previously mined site to a better standard than the present state, removal of pests)
- Environmental benefits over and above rehabilitation activities to be paid or made in association with native vegetation clearance
- Carbon offsets

7 STAKEHOLDER CONSULTATION

This section should identify affected parties including details of any communities that may be affected and a description of their views. Stakeholder consultation by the proponent prior to submission to PIRSA is a key aspect of the development of the documentation.

This section should also summarise the results of any consultation, proposed and/or undertaken, about relevant impacts of the Proposal for a new mine or existing operation. The summary should list:

- The individual (or if not practical the groups of stakeholders)
- Type of stakeholder (resident, council, government agency etc)
- The concerns / issues raised and
- The response to those concerns

If appropriate, this information may be summarised in a table.

Given that this operation is located adjacent to the Beverly Uranium Mine, a source of information on stakeholder concerns may be derived from reviewing complaints received about the Beverley operation or ongoing one-on-one meetings with neighbouring landowners

Consultation should also be undertaken on planning for mine closure. Adjacent landholders, the local community and other people may also have an interest in the site after mine or quarry closure, and it is important to recognize that these people may be different to those identified regarding ongoing operations of the mine or quarry. It is important to acknowledge that the number and diversity of people with an interest in closure and their level of engagement may change over time, particularly if the operations have a long life.

8 MANAGEMENT OF ENVIRONMENTAL, SOCIAL AND ECONOMIC ASPECTS

8.1 Requirements

This section is perhaps the most important in the document, and therefore warrants the application of considerable effort and resources on behalf of the proponent. It will form the basis of how the operation will be regulated, including the circumstances where PIRSA or DEWHA will take appropriate enforcement action.

PIRSA have adopted a performance or objective based approach to regulation (focus on the outcomes to be achieved), rather than the traditional prescriptive approach (focus on the control measures). This approach allows for more freedom on the part of the mine operator, and will provide for increased trust by stakeholders through a clear demonstration that the environmental, social and economic impacts of the mining operation are being managed appropriately.

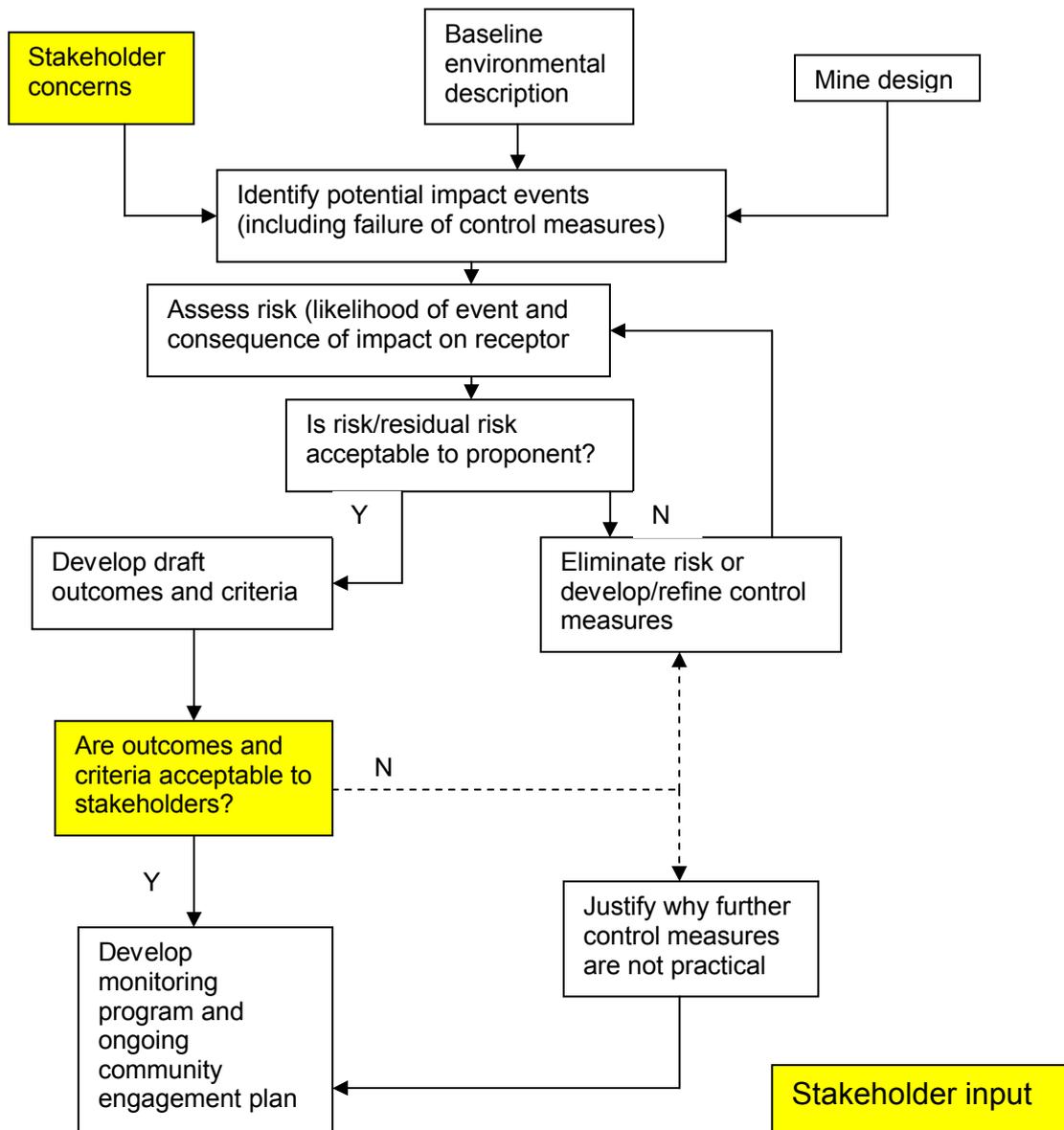
Both the Proposal and the MARP should identify all of the environmental, social and economic impacts or events (inclusive of nuisances) that are likely to be created by the mining operation, and how each of the identified impacts will be managed. Appendix 2 provides some examples of the types of aspects that may occur in relation to mining projects.

The level of detail required is the same for both the Proposal and the MARP in regards to the identification of all impacts, the assessment of significance (risk) and the desired outcome to be achieved. For a Proposal the control measures, measurement criteria and monitoring programme may be described in more conceptual terms and subject to further refinement. For the MARP these must be described in detail and finalised in the document.

For each aspect identified, a management program should be developed and as a minimum contain the elements described in sections 8.3 to 8.11.

The process to be followed in developing these sections is summarised in the following flowchart:

Process flowchart:



8.2 Supporting resources

The process required in this section generally follows key elements of the "Planning" part of ISO14001 standard for Environmental Management Systems (Section 4.3 of the Standard). Other parts of the ISO 14000 standard (sections 4.2, and 4.4, 4.5 and 4.6) are addressed under section 10 of this document.

The process of identifying and assessing the significance of aspects in general follows the Australian and New Zealand standard (AS4360:1999) for risk assessment. HB203:2000 from Standards Australia also provides a clear guide to environmental risk assessment and the application of AS 4360.

The Leading Practice Sustainable Development Program for the Mining Industry (LPSPD) booklet series (available from <http://www.industry.gov.au/>) and the MCA

Enduring Value resource database (available from <http://www.minerals.org.au>) are also useful resources for developing risk management strategies for various aspects of mining operations.

8.3 Describe the context and stakeholder views

The section should describe the context of the aspect being considered and include consideration of the existing environment (e.g. is the site remote, what is the stakeholders perception of the site?), the concerns of external stakeholders and the scope for investment in control measures given the economics of the mining operation or OHS hazard management.

For risks to the aquifer, this section should state the actual or potential uses of the groundwater that may need to be protected (e.g. pastoral use or natural springs)

8.4 Applicable legislation and standards:

This section should identify all applicable legislative or other standards (e.g. EPA noise or water quality policies). This may be other state based legislation (e.g. *Environment Protection Act*) or Commonwealth legislation, standards and guidelines (e.g. *Environment Protection and Biodiversity Conservation Act*, *National Environment Protection Council Act* - NEPM standards)

8.5 Potential Impact/events

Identify and describe the actual and/or credible potential impact events associated with proposed mining activities that could pose a threat to the:

- Natural environment (including air quality, surface and underground water supplies, flora, fauna, landform stability etc.)
- Social environment (including public health, amenity, nuisance, fires, heritage, use of public resources etc.)
- Economic environment (including regional economy, individual landholder incomes, land values etc.)

Events associated with construction should be considered as well as events associated with operation of the mine, where these may differ.

Consider the particular complexity posed by environmental and social risk assessment (as opposed to conventional risk analysis) that may apply to some events such as:

- The difficulty, due to lack of data, of realistically estimating risk factors, and corresponding issues of perceptions of risk by stakeholders, and difficulty in determining the appropriate outcome.
- The potential long timeframes associated with environmental events, or conversely, where they can be rehabilitated, the short timeframes given that mining is usually a temporary activity

- Cumulative effects of the event being repeated many times, possibly by other industries or operators in the area
- The inherent resilience of the natural environment to cope with impacts
- Potential for some impacts to be unknown, unpredictable or irreversible

The impact event analysis should identify the:

- Source/event
- Pathway
- Barrier
- Receptor (human, fauna, flora etc)
- Impact/consequences (scope, ability to remediate, duration, cumulative effects etc)

The basis for the determination of these issues should be described in detail.

Many of these impact events will have been identified through preliminary survey work and stakeholder consultation. For major project Proposals, it is strongly encouraged to conduct a workshop at which key stakeholders are invited to participate (including PIRSA and other government agencies), to identify aspects and impacts/events, and to initially assess the significance of each of these events.

For ISR mining a key impact event will be the effect of the mining and disposal solutions on the groundwater system. Consideration needs to be given to:

- The current and potential environmental values (potential pastoral use and environmental use via natural springs) of both the mining/disposal aquifer and any over or underlying aquifers (both at the mine site and at any remote locations where fluids may migrate over time)
- Lateral extent of the mining/disposal aquifer and lateral barriers to migration
- The natural hydraulic gradient and aquifer permeability (which will determine the location and time frames for migration of fluids)
- Potential linkages and relative pressures with other aquifer systems (potential pathways for migration of fluid)
- Evidence for natural attenuation (rate, extent of aquifer affected)
- Any uncertainty related to the above issues

The effect of impacts may often be usefully demonstrated by the use of modelling appropriate to the level of risk. If a model is constructed, this may also be used to demonstrate the effect of proposed control measures. The description of the model must clearly state the assumptions used to build the model, and evaluate the effects these assumptions (or alternately valid assumptions) may have on the conclusions reached.

Major issues arising from public consultation, even if not technically justified, should be considered as a social impact event and appropriately addressed.

Note that identification of impact events should not include health and safety risks to workers at the mine (which are regulated under other legislation), but should include any risks posed by the operation to public health and safety.

If **native vegetation** is proposed to be cleared the following should be included:

- An appraisal of the condition and significance of the vegetation*
- An appraisal of the impacts of the clearance*
- The estimated significant environmental benefit (SEB) to be provided in exchange for the proposed clearance*

**Refer PIRSA/DWLBC Guideline – Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the clearance of native vegetation clearance associated with the minerals and petroleum industry (September, 2005).*

8.6 Control and management strategies

A description of any proposed control and management strategies to reduce environmental impacts should be included here. The strategies should implement best practice mining and environmental management, be technically and economically achievable and reflect progressive rehabilitation wherever possible.

The risk should be addressed using an accepted hierarchy of controls approach, applied in the following order

Elimination

Redesign so as to eliminate the risk.

Substitution

Replace the material or process with a less hazardous one. For example, replace hydrocarbon solvent in processing with water based chemicals.

Design engineering (physical) controls

Install barriers to control the risk (e.g. HDPE liner to protect groundwater).

Management system (procedure) controls

Manage the risk through procedures and the way the activity is conducted by personnel e.g. induction and training for new employees to ensure awareness of aboriginal heritage and to avoid unauthorised disturbance.

For ISR mines, natural attenuation may be considered a control measure to avoid impact on aquifer environmental values. If this is to be relied upon, evidence must be provided that demonstrates that this will actually occur with some certainty before reaching an area of environmental value due to the natural hydraulic gradient.

The description of the control strategies should clearly state if it is a *design* (physical) based measure (e.g. cementing well casing) or if it is a *management system* (procedure) based measure (e.g. induction and training of contractors regarding

appropriate techniques) and how it avoids or reduces the *likelihood* of the event occurring or the *consequences* of an event, should it happen.

As noted in the previous section, the effect of control strategies may often be usefully demonstrated through numerical modelling, showing the effect of the impact after the control strategy has been implemented.

To comply with Schedule 4 of the EPBC Regulations, this section should include the following information:

- A description, and an assessment of the expected or predicted effectiveness of, the control strategy
- Any statutory or policy basis for the control strategy
- The cost of the control strategy
- An outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring of the impacts of the proposal
- The name of the agency responsible for endorsing or approving each control strategy
- A consolidated list of control strategies proposed to be undertaken to prevent, minimise or compensate for the impacts of the proposal, including mitigation measures proposed to be taken by State governments, local governments or the proponent.

Where **native vegetation** is proposed to be cleared, the control and management strategy will be the Significant Environmental Benefit (SEB) that is proposed to offset the native vegetation clearance (e.g. at the site of the operations or within the same region of the state). Some possible ways SEB may be provided are:

- Acquiring land, protecting and funding ongoing management of those areas (may include the donation to organisations for conservation) and/or undertaking revegetation/restoration activities on that land to re-establish habitats
- Supporting research into rehabilitation of ecosystems/habitats
- Supporting regionally based NRM projects with a biodiversity focus
- Removal of threats/management of existing vegetation e.g. weed management on roadsides
- Working with local government or other bodies to undertake environmental remediation or revegetation in areas under the control of such bodies (eg re-establish roadside vegetation)
- Fund/undertake projects in Crown estate parks and reserves in the region
- Rehabilitation, protection and management of salt-affected habitats
- Targeted feral animal reduction programs aimed at assisting the recovery of specific species
- Any other approved activities as identified by the proponent that are likely to have a significant environmental benefit

If none of the above can be provided, payment into the Native Vegetation Fund may need to be made.

Details of the proposed SEB should be provided including timing of the provision of the SEB.

Further guidance may be found in the PIRSA/DWLBC Guideline – Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the clearance of native vegetation clearance associated with the minerals and petroleum industry (September, 2005).

8.7 Likelihood and severity of consequence risks associated with the aspect.

In order to determine the level of risk associated with various impact events, both the likelihood and severity of the consequences of impact events have to be separately considered. Risk should be evaluated and documented both before and after proposed control strategies have been taken into consideration.

Qualitative measure of Likelihood: The likelihood of each event occurring should be determined based on information such as past experience, known environmental data and modelling data. The likelihood can be classified using a system such as in AS 4360 or another recognised risk assessment methodology

Qualitative measure of Consequences: The consequences of each event occurring should be determined, based on information such as the potential scale of the event, the range of stakeholders who may be affected, the duration of the event and the difficulty in remediation of the impact.

There should be an evaluation of the uncertainty of the final risk determination due to factors such as:

- Lack of data / knowledge of the environment or the event or the consequences on the receptor
- Use of novel or innovative control measures
- Natural climate variations

Analysis of some impact events may result in a conclusion that the event is not credible or near impossible in this situation. This should be documented as part of the risk assessment.

Where appropriate, the potential for the risk to be greater than that stated should be documented.

8.8 Justification for acceptance of residual risk

This section should justify that the residual risks (i.e. after control measures have been implemented) associated with credible events will be managed to "As low as reasonably practicable" (ALARP).

Where the risk has not been eliminated, you will need to provide justification that the risk is ALARP by either of the following:

- There are no practical control measures available, and the risk is considered acceptable in context of the mining industry and surrounding environment and given the other benefits that will arise from the mining operation, which will outweigh the risk; or

- The cost of implementing further control measures is grossly excessive compared to the benefit obtained. In this case there should be included in this section a description and evaluation of these alternate control measures.

8.9 Outcomes

Both this section (outcomes) and the following (criteria) are critical sections for the document, and must be prepared to an appropriate standard.

Based on the identified environmental, social and economic impacts and events and associated risk, a set of outcomes (with associated measurable assessment criteria) should be developed that the proponent is able to publicly commit to. In general these will be based on the residual risk identified in the previous section.

Not all aspects identified will require an outcome to be developed. If the risk can be demonstrated to be impossible or trivial in consequence without the use of control measures, an outcome and criterion may not be needed. However where the risk is such that specific control measures are required to eliminate the risk, or there are strong public perceptions, or there is uncertainty in the risk level, an outcome and criterion are required.

The outcomes should be developed in consultation with stakeholders and written as clear and unambiguous statements. The words "minimise / maximise", "as far as practical", "monitor" or words that describe the management process (e.g. "avoid" "prevent", "control", "manage" etc) should not be used in developing outcome statements. Outcome statements should ideally begin with "No", "All", "Maintain" or "Increase / Decrease".

For ISR mining, key outcomes will relate to protection of aquifers and depend on the environmental values identified for the site. For example, where the mining aquifer has been identified as having potential pastoral use off the lease area, and outcome might be:

"No compromise of potential pastoral use outside the lease area of the XYZ aquifer due to the use of mining solutions"

Where native vegetation is proposed to be cleared and is unavoidable, the objective should state a commitment to compliance with the *Native Vegetation Act* and Regulations e.g. *"No native vegetation clearance unless in accordance with the Native Vegetation Act, Regulations and SEB policy"*.

These outcomes must be fully developed for both the Proposal and the MARP.

8.10 Outcome measurement criteria

Clear and measurable criteria should also be set to demonstrate how the outcomes will be achieved. The criteria must be explicit and as far as practical, quantifiable. These criteria will be used by PIRSA and DEWHA as the key indicators of compliance.

The criteria included in the MARP must demonstrate clear and unambiguous

achievement of the environmental outcomes by:

- Including the specific parameters to be measured and monitored by the Lessee
- Specifying the locations where the parameters will be measured, or how these locations will be determined
- Clearly stating the acceptable values for demonstrating achievement of the outcome, with consideration of any inherent errors of measurement
- Specifying the frequency of monitoring by the Lessee
- Identifying what background or control data are to be used or specify how it will be acquired (if necessary)

For example, the criterion for the outcome:

“No compromise of potential pastoral use outside the lease area of the XYZ aquifer due to the use of mining solutions”

might be:

“Monitor wells located near the lease boundary in the XYZ aquifer, are monitored for pH, SO₄ and U and demonstrate no values outside the following limits:

pH < 5

SO₄ > XXmg/L

U > YYppm”

If the outcome is to be measured against background levels, these must be already acquired and stated in the MARP, or if in relation to control points, provide a clear process about how this data will be acquired during operations. For Proposals, measurement criteria may be stated in more conceptual terms, if background data are still to be acquired.

Criteria will form the basis for regulation of the operation by PIRSA and DEWHA, and you should be careful in developing these that you are confident that you will be able to meet the criterion stated. If it is not possible to meet the criterion in all circumstances (perhaps due to natural background variations), the wording should reflect this. For example, in the above criterion, it might say “at least 95% of U measurements are less than YY ppm in any one year”.

Where appropriate, recognised industry standards, codes of practice or legislative provisions from other Acts can be used as criteria (e.g. Radiation dose limits).

The measurement criteria should drive development of the monitoring plan.

All point related criteria, such as water bores, sampling points, visual amenity photo points etc, should be included on a map and in a table of GPS locations of the points. Error values for GPS points are to be included.

Where native vegetation is proposed to be cleared, the criteria will be demonstration of the successful implementation of the SEB plan.

8.11 Leading Indicator criteria

For each aspect where there is a high consequence event that relies significantly on a control strategy to reduce the risk, leading indicator criteria should be developed. These should, if monitored, give early warning that the control measure is failing and the outcome is potentially at risk of not being achieved. These may relate to the proposed control measures e.g. audits of the management system, near misses, or trends in environmental data.

Detection of unexpected results should lead to immediate action being taken.

An example of this for the outcome and criterion described in the above sections might be *“an increasing trend in pH, So4 or U concentration”*

The leading indicator criteria should be included in the monitoring plan.

8.12 Company compliance monitoring plan

A company driven (internal, not reliant on PIRSA inspections) monitoring program to measure the achievement of each outcome and the effectiveness of each strategy should be described in the MARP. For a mining lease proposal this section need not be included in detail. However to comply with Schedule 4 of the EPBC Regulations, the proposal must include the following information:

- an outline of monitoring programs for the relevant impacts of the proposal, including any provisions for independent environmental auditing;
- the name of the agency responsible for endorsing or approving the monitoring program;

Details of the monitoring program will be included in the MARP and will be built from the outcome measurement criteria and leading indicator criteria identified in the proposal.

The monitoring program should state:

- What will be measured
- The accuracy of measurements (if applicable)
- Who will measure (responsibility)
- Where will it be measured (including controls and baseline),
- How will it be measured
- Frequency of measurement
- Record keeping
- Frequency of reporting to management and external stakeholders

8.13 Ongoing Community engagement plan

A process should be developed in the MARP to enable open dialogue with stakeholders on compliance issues associated with the operation.

The plan may include a complaints hotline, ongoing community consultative meetings and regular personal visits with adjacent landholders. The plan should include a process to report on compliance with lease conditions and the MARP, even in cases where the operation is in compliance with regulatory requirements, not just in cases where non-compliance has occurred.

The frequency of reporting should reflect the perceived importance by stakeholders or actual risk.

The plan may also address opportunities for further community development such as ongoing training, support for local enterprises and infrastructure development.

9 MINE COMPLETION

9.1 General principles

It is expected that for most mining operations, progressive rehabilitation of mined out areas will occur and this should be described as part of the description of normal operations.

Mine completion strategies should follow the objectives and principles outlined in 'Strategic framework for mine closure (2000)' developed by the Minerals Council of Australia and the former Australian and New Zealand Minerals and Energy Council (now the Ministerial Council on Mineral and Petroleum Resources) and further developed in the 'Leading Practice Sustainable Development Program for the Mining Industry - Mine Closure and Completion (2006)':

1. Enabling all stakeholders to have their interests considered
2. Ensuring that mine closure occurs in an orderly, cost-effective and timely manner
3. Ensuring the cost of rehabilitation is adequately represented in company accounts and that the community is not left with the liability
4. Ensuring there is clear accountability, and adequate resources for rehabilitation.
5. Establishing a set of indicators, which will demonstrate the successful completion of rehabilitation
6. Reaching a point where the company has met agreed completion criteria to the satisfaction of the regulating authority

The underlying methodology is a 'risk-based closure planning process'.

The mine site could be divided into domains as appropriate with a separate plan for each (e.g. Bore fields, processing plant, Waste facilities, ponds).

This section must demonstrate that the site will be progressively rehabilitated (where practical) to a stable condition and use, consistent with the land use at the time mining operations commenced, or to a post mining land use as agreed with stakeholders (including the landowner).

If final land use differs from the pre-mining land use, then it must be demonstrated that the proposed land use is acceptable to all stakeholders and consistent with current land zoning or development plan requirements.

9.2 Description of mine site at completion

This section should describe the mine as it will be at completion (and after all progressive rehabilitation has been completed).

- Describe the mine site at completion (landforms, vegetation cover)
- Describe progressive and final rehabilitation strategies that address all of the following completion outcomes and demonstrate that they will be achieved indefinitely post closure:

- 1. External visual amenity of the site is acceptable in accordance with the reasonable expectations of relevant stakeholders**
- 2. Risk to health and safety of the public and fauna is as low as reasonably achievable**
- 3. No compromise to the water quality of aquifers that have (or potentially have) economic or environmental use.**
- 4. Ecosystem and landscape function is resilient, self sustaining and indicating that the pre-mining ecosystem and landscape function will ultimately be achieved.**
- 5. All waste materials left at the site are chemically and physically stable**
- 6. All other legislative requirements have been met (eg Radiation Protection and Control Act, Environment Protection Act)**

Note: The strategies should implement best practice mining and environmental management. They should be technically and economically achievable and sustainable with minimal ongoing maintenance, and if left till closure, it should be demonstrated that they are not practically able to be implemented as progressive rehabilitation during mining operations.

Control strategies should not be reliant on ongoing maintenance or monitoring, and should be focussed on stable physical measures. This is due to the difficulty in ensuring ongoing responsibility and adequate resources for the site in the long term once the tenement holder has relinquished the mining lease.

The final proposed landform and vegetation cover should be shown on a map/plan (or a series of maps/plans) and include the following:

- *Natural contours of land proposed not to be disturbed by the mining operations*
- *Existing native vegetation (including rehabilitated and planted areas)*
- *Mining infrastructure that will remain on site (i.e. will become the responsibility of another party)*
- *Location, description and management of waste disposal areas (as included in section 4.6)*

9.3 Completion risk assessment

Demonstrate that the strategies to address the impacts are likely to be self sustainable in the long term

Note: The effectiveness of proposed control strategies may need to be demonstrated through relevant examples of successful implementation or modelling; showing the effect of the impact after the control strategy has been implemented.

In some cases, where there is significant reliance on engineered protective structures to reduce post completion risks, an independent 3rd party audit of the closure design

and modelling may be required to demonstrate that the structure is likely to meet agreed outcomes.

This demonstration needs to consider that the timeframes are much longer than for the operating phase. For instance 1-in-100 year rainfall events may be considered appropriate for assessing risks during the operational phase, but longer period events may be more appropriate for closure.

Describe residual post completion risks and contingency strategies. Residual completion risks may include:

- Financial
- Poor management of progressive rehabilitation activities
- Experimental or novel rehabilitation techniques
- Ongoing maintenance requirements for protective structures
- Unexpected or unusual climatic conditions
- Changes to surrounding land use
- Inadequate understanding of the existing environment and the impacts of the operations.

Describe how closure risk might be controlled (e.g. by contingency provision in cost estimates) and demonstrate that these risks have been managed to “as low as reasonably achievable”.

Describe what rehabilitation of existing disturbed areas will be incorporated into ongoing operations. Clearly indicate those existing disturbed areas that are not considered technically and financially capable of being rehabilitated as part of ongoing operations.

For ISR mines, there may be reliance on natural attenuation to achieve outcomes relating to protection of aquifers. If this is the case, detailed evidence will need to be provided that demonstrates with confidence that this attenuation will occur in this aquifer, and demonstrate that the attenuation will occur in an appropriate timeframe, perhaps by the use of modelling. Where attenuation cannot be demonstrated to occur at this site with some certainty, a research programme may be developed to provide this certainty, but in this case, a contingency rehabilitation plan will need to be provided to achieve the outcome, should the research not provide confidence in attenuation.

9.4 Completion criteria

For the relevant outcomes listed in section 5.8.2 completion criteria must be developed. Demonstration that these criteria have been achieved will be used as the basis to approve lease relinquishment at the appropriate time.

Clear and measurable criteria should be set to demonstrate the achievement of outcomes. These should be explicit and quantifiable as far as practical. As the criteria will form the basis for relinquishment of the lease, care should be taken by the tenement holder in the development of these criteria that they can be confidently met. Where appropriate, recognised industry standards, codes of practice or legislative provisions from other Acts can be used as criteria.

An example closure criterion for demonstrating achievement of the outcome:

“No compromise to the water quality of aquifers that have (or potentially have) economic or environmental use”

Might be:

“Pressures in the XYZ aquifer at end of mining are restored to no more than the pre-mining level, which will establish a zero or negative gradient to areas of the aquifer with potential pastoral use.”

9.5 Closure cost estimate

Include an estimate of 3rd party rehabilitation and decommissioning costs at the end of mine life in the MARP (this is not required for the Proposal). Where the operation is undertaking progressive rehabilitation, the maximum rehabilitation liability at any point in the mine life should be used as the basis for calculating the rehabilitation liability.

A comprehensive spreadsheet type calculation model should be developed and included. The model should include where applicable:

- The decommissioning domain or component
- An estimate of the area, volume, machinery type, personnel, material and/or time (as appropriate) as a measure of the rehabilitation effort required, and how these estimates were derived
- The rehabilitation costs per unit of rehabilitation effort, and how these costs were derived (including a breakdown of all unit costs)
- Any costs for ongoing maintenance and management
- Survey and design
- Project Management, administration (normally 10-25% of total costs)
- Provision for normal project variation (10-20%)
- Provision for contingency costs
- Allowance for inflation

The cost should be calculated on the basis that a third party contractor would undertake the rehabilitation work. Unprocessed material and salvage costs may not be deducted, due to the likelihood that as an unsecured creditor, the Government would not be able to access these assets.

In some cases it may be desirable to avoid large up front bonds and in this case a staged bond schedule could be proposed, that reflects the increasing liability as mining progresses, and gradually reduces the bond as rehabilitation progresses. If this option is chosen, the staging frequency can be no more than annual, and the stages must reflect the maximum liability at any time during the forward year.

There will always be some financial risk associated with uncertainty in estimating rehabilitation and closure costs, and contingency costs are a critical element of the mine closure cost estimate.

Key risks are:

- Residual risk (section 8.8)

- The potential to underestimate the costs or effort required to rehabilitate
- Planned rehabilitation may fail (and hence will require further effort or redesign to achieve the agreed outcomes)
- Sudden (unplanned) closure
- Temporary closure (care and maintenance)

The closure plan must document closure cost uncertainty.

The cost estimates determined from the preceding may be used by PIRSA to calculate and set an appropriate bond for the operation.

The MARP should also describe how provision will be made in the company's accounts for the rehabilitation liability (in accordance with AASB137: Provisions, Contingent Liabilities and Contingent Assets), and how this liability will be reviewed during the life of the project, and how the liability will be provided for as the mine progresses, to ensure that sufficient funds are left at mine close to fully fund rehabilitation without recourse to the statutory *Mining Act* bond.

Public liability insurance will be required for all leases and licences, and the MARP should summarize the major provisions of the policy, in particular the types of events that will be covered (e.g. sudden and accidental pollution of aquifers etc).

9.6 Mine closure schedule

A rehabilitation and closure schedule should be outlined in the MARP, with clear milestones and timeframes. This may be presented as a Gantt type chart.

The schedule should clearly indicate:

- Human resources/ responsibility for implementation
- Other resources needed to ensure compliance
- Progressive and final rehabilitation activities
- Any ongoing maintenance and monitoring requirements after closure of the operation
- Monitoring and survey requirements (remaining structures and areas of contamination)
- Documentation/reporting/records

The plan should not state fixed time periods for post closure monitoring, but commit to monitoring for as long as necessary to demonstrate that the completion criteria have been met.

The plan should focus on progressive rehabilitation activities where practical. This is considered good practice and will reduce your financial liability (which may be reflected in early return of, or reduced, rehabilitation bonds) but will also build community confidence by demonstrating that rehabilitation can be successfully completed, and reduces the day-today footprint of the mining operation.

10 MANAGEMENT SYSTEMS AND CAPABILITY

The MARP should provide a demonstration that the proposed lessee or operator has the capability to operate the lease in a manner that ensures public safety and protection of the environment. The proposal should include at least a summary of the previous experience and past compliance record of the applicant.

This process broadly follows elements found in quality management systems standards (such as the AS/NZS ISO 9000), and particularly the Environmental Management Systems standard (AS/NZS ISO 14000) and Compliance Programs standard (AS 3806). Some operators may already have quality management systems in place equivalent to these requirements and hence should have no difficulty in providing adequate documentation to demonstrate that they have the appropriate capability.

The regulatory bodies will not be approving the management system and does not want or expect that the documentation for the whole system be submitted. Rather there is a need to have confidence that the operator has in place sufficient systems to ensure compliance at the time the MARP is approved (whether for a new or an existing operation). It is also recognised that evidence relating to this demonstration may change with time, but it is not required that changes to management systems will require a review of the MARP. This information will be used to assess the risk of non-compliance by the mine operator and to plan surveillance activities.

Evidence should be provided that the mine operator has in place systems to address the following assessment factors. This may be provided by a third party audit.

10.1 Management commitment

Standard Reference: AS/NZS ISO 14001 (4.2, 4.), AS3806 (3.1, 3.2, 4.3)

Evidence should be provided that the highest level of company management publicly expresses a commitment to:

- Protect the natural environment, public safety and amenity,
- Compliance with regulatory requirements and with relevant legislation
- Achievement of agreed environmental and social outcomes.

Evidence should be provided that there is a commitment to continuous improvement and the prevention of non-compliance. There should be evidence that a compliance culture is encouraged.

Demonstration may be provided by:

- The company's published environmental policy
- Published values and commitment to compliance e.g. Annual reports
- Demonstration of a visible reward and punishment system for compliant or non-compliant behaviour that is consistent at all levels of the organisation
- Demonstration that compliance performance is part of all job descriptions
- Induction program emphasises compliance and values

10.2 Procedures or practices to achieve compliance.

Standard Reference: AS/NZS ISO 14001 (4.4.6), AS3806 (4.4)

Manuals or guidelines that outline the safe and environmentally sound operation of all activities associated with mine operation are required to ensure all staff and contractors undertake activities in way that will ensure compliance with lease conditions and the environmental and social outcomes agreed in the MARP.

Demonstration may be provided by:

- Any document that provides a clear outline and description of the system and its components to be utilised by the licensee or operator to ensure compliance with the Mining Act, in particular the environmental objectives stated in the MARP and lease conditions (e.g. operations manuals, construction guidelines, procedures, etc.); and
- The submitted document addresses regulatory requirements and the MARP objectives both directly (in a statement of intended adherence to the Mining Act, lease conditions and the MARP objectives) and indirectly (in the described method of operation of the activity).

Note: Complete procedure manuals are not required or appropriate as evidence to support this section; rather there should be a summary of the scope of procedures covered. An example of a procedure may be included to demonstrate the format of procedures.

10.3. Risk management system

Standard Reference: AS/NZS ISO 14001 (4.3.1), AS 3806 (3.5, 4.4)

A comprehensive and effective ongoing risk management system is a critical part in ensuring that outcomes and criteria in the MARP remain appropriate.

Demonstration may be provided by:

- Evidence that the operator and/or its lead contractor has a system to continuously evaluate and refine environmental and social risks associated with the activity, including site-specific risks; and
- A demonstration of the specific risk management systems in place (e.g. job hazard analysis, permit to work system, management of change system, etc.)
- Evidence that there is a system to maintain and service plant and equipment, and to assess their ongoing fitness-for-purpose as per their original design

10.4. System to monitor, record, evaluate, audit and review compliance

Standard Reference AS/NZS ISO 14001 (4.5.1, 4.5.2), AS 3806(3.5, 5.1, 5.2)

A key element of an operator's capability to comply with the Act is having a system to monitor, audit and assess compliance against lease conditions and the environmental outcomes agreed in the MARP

Demonstration may be provided by:

- Evidence of a system such as the use of a legislative compliance register or checklist. A checklist alone is not enough —the frequency with which this checklist will be utilised and when it is planned to be audited and assessed must also be specified; and
- Evidence of an incident management system, to correct both the specific non-compliance and the potential for recurrence
- Evidence of the process to monitor and evaluate performance (e.g. against MARP outcomes and criteria);

10.5. Preparedness to respond to non-compliances and emergencies.

Standard Reference: AS/NZS ISO 14001 (4.4.7), AS3806 (4.4)

A comprehensive and effective response plan ensures that if an environmental incident should occur, the system is in place to take action to minimise the effect of the incident, to remediate as far as practical and the management system is modified to prevent a recurrence.

Serious environmental incidents may include fire, flood, spills and excursion of mining and waste fluids.

Demonstration may be provided by:

- Demonstration that site-specific or incident specific response plans are in existence. This should at least outline the incidents that are covered by the plan, and the anticipated response, should the incident occur.
- Where a contractor response plan is to be used, a 'bridging document' must be provided which identifies the site and activity specific response plan details and their connection to the operator's system.

10.6. Mechanism to audit and review the compliance system

Standard Reference: (AS/NZS ISO 14001(4.5.4,4.6), AS 3806 (6)

A process of audit, review and continuous improvement of the whole compliance system should be in place. This should be driven by senior management.

Demonstration may be provided by:

- System audit process, including how results are reported and actioned
- How often and who conducts a review of the compliance system
- Who is responsible

10.7 Mechanism to respond to and communicate with external parties on compliance.

Standard Reference: (AS/NZS ISO 14001(4.4.3), AS 3806 (5.1.2), AS 4269

A process of openly communicating with external stakeholders should be established to build trust and respond appropriately to complaints from the public

about the operation. This is particularly important when the mine is located near to an urban community.

Demonstration may be provided by:

- Establishing a complaints hotline or record system, and showing how complaints are dealt with
- Establishment of an community consultative committee to discuss the ongoing operations of the mine
- The process of notification of significant incidents to regulatory agencies, the public and other interested parties
- A process to audit and review the compliance system itself.

10.8 Appropriate employee communication, training, awareness and competence in regulatory requirements

Standard Reference: AS/NZS ISO 14001 (4.4.2, 4.4.3), AS 3806 (4.2)

An operator's management may be aware of the necessary regulatory requirements, however it is important that management disseminates this information downwards to ensure that employees (including contracted employees) are aware of their responsibilities in maintaining regulatory compliance.

This assessment factor relates to educating employees and contractors about the important issues. For example, employees do not need to know the specific requirements of the Mining Act, however, as part of the induction, it may be useful to mention that there are lease conditions and MARP outcomes covering protection of the social and natural environment, and as such this is why procedure X should be followed exactly.

Demonstration may be provided by:

- A copy of the induction booklet given to employees and contractors that not only addresses job-specific issues, but also addresses the site-specific issues, and includes environmental as well as health and safety issues
- A description of the training programme provided to employees
- A copy of an induction program that is suitable for site visitors (if different from employee induction)
- If appropriate, a description of any plans for refresher training of employees and/or contractors (for longer term activities)

10.9. Structure, responsibility and resources to be allocated specifically to compliance

Standard Reference: AS/NZS ISO 14001 (4.4.1), AS3806 (3.3, 4.1)

Adequate resources are required to ensure that a compliance system will work. Documentation is often in place, but without adequate resources the system is susceptible to failure.

Demonstration may be provided by:

- A personnel or management chart showing the proposed supervision structure, including job titles and summary of duties
- Nominating who will be responsible and accountable for compliance (monitoring, reporting, corrective action, system auditing, system review etc) in various parts of the operation, and the expected proportion of these people's workload to be spent on these activities
- A statement of the financial position of the company

10.10. Previous experience of operator

Ideally, there should be evidence of a good long-term compliance record for similar operations conducted in this state. If not, at least the recent record should show good or improving compliance. Details must be provided of any previous proceedings and/or convictions under Commonwealth or State law for the protection of the environment or the conservation and sustainable use of natural resources against:

- The person proposing to take the action; and
- For an action for which a person has applied for a permit, the person making the application.

As a minimum, experience should be provided for managing this type of operation anywhere in Australia or elsewhere, and in operating in this particular type of environment.

If there is no record for the operator or lessee, the use of an experienced contractor or staff with a good record may give confidence that regulatory objectives will be achieved.

10.11 Lease conditions

The MARP should include a section that demonstrates where specific lease conditions under Schedule 1 and 2 have been addressed in the MARP (if relevant) or demonstrates otherwise that they have, or will be, complied with.

11. FORMAT OF SUBMISSIONS

11.1 General

Three hardcopies and an electronic version of the draft should be submitted; the information in all should be identical. Each page, plan or other separate sheet should include the tenement number, date of the report and sequential page numbering.

11.2 Hardcopy requirements

Hardcopy reports should be presented such that:

- They are bound as one or more volumes using bindings that can be easily removed and replaced for copying and scanning purposes if required (e.g. ring binders, or re-useable spined plastic binding).
- Data are of sufficient size and clarity to allow clear and legible reproduction from original-scale scanned images.
- Text is typed on white A4 paper with adequate margins and sequential page numbering throughout.
- Non-A4 size material and multiple figures, plans and tables are included together at the end of the bound report, rather than interspersed throughout the text and are sequentially numbered. Maps and plans should be in folders or pockets (not loose) and be folded so that the title, tenement number and date are visible. All items of this type should be listed in the report contents page.

11.3 Digital requirements

Where possible we request the complete report (text/figures and appendices) is supplied as a single Acrobat PDF file. In order to keep file sizes to an acceptable level, please note the following when creating PDF files from native formats:

- Plans and photographs either as separate pages or embedded into text are to be down sampled to 200dpi
- Plans generated from GIS applications are to be saved as JPEG format at 200 dpi and then converted to PDF
- Any hard copy documents are to be scanned at 300 dpi (black and white text/plans) or 200 dpi (colour plans/photographs)

However, where this is not possible PIRSA will accept the following formats of any individual components that may be available. Where individual digital components are supplied please provide a file list and the corresponding report reference e.g. text, appendix or plan number.

Electronic data will be accepted via E-mail or on CD-ROM or DVD-ROM format.

Data type	Description	Format	Suffix
Text	Report text (documents, figures, tables, etc.)	Adobe Acrobat PDF Word	.pdf .doc
Tables		Excel	.xls
Maps, plans, figures and photographs not embodied in report text	Individual files of maps, plans, etc.	Adobe Acrobat PDF TIFF JPEG EPS	.pdf .tif .jpg .eps
Scanned documents	Black and white text and plans Colour plans and photographs	TIFF, at 300 dpi JPEG, at 200 dpi	.tif .jpg

A digital back up copy of all digital information submitted should be kept by the lessee for a period of at least one year to cover the possibility of information corruption during transfer.

11.4 General requirements for maps, plans and sections

All maps and sections should conform to the following standards.

Scale — an appropriate standard metric scale should be chosen to best represent the information required (e.g. 1:25 000, 1:10 000, 1:5000, and 1:4000 for larger mines).

Datum — plans and cross sections should refer to AHD, GDA94

Title block — plans should have a title block in the lower right hand corner of the sheet with the following information:

- Name and number of the mine
- Author
- Scale
- Title and number of the plan
- Date
- Tenement number and mining approval number (where applicable)

Legend — plans should have a clear and comprehensive legend to identify the symbols and colours used;

Maps, plans, figures, images and sections should also:

- Use metric measurements throughout
- Show graphic bar scale
- Show any local grid lines and standards
- Have a north point or orientation of sections

12. REFERENCES AND RESOURCES

CSIRO

'Review of environmental impacts of the acid in-situ leach uranium mining process' by G Taylor, V Farrington, P Woods, R Ring and R Molloy. CSIRO Land and Water Client Report prepared for SA EPA, August, 2004

PIRSA PUBLICATIONS

Copies of the Mining Act and regulations are available as free downloads from:

<http://www.legislation.sa.gov.au/index.aspx>

PIRSA Earth Resources Information Sheet M6 'Prospecting and Mining for Minerals'

PIRSA Earth Resources Information Sheet M29 — *Aboriginal Heritage Act 1988* and Aboriginal site avoidance guidelines, particularly with respect to confidentiality issues.

PIRSA Earth Resources Information Sheet M31 - Guidelines for exploration on Native Title Land - Part 9B of the Mining Act

PIRSA Earth Resources Information Sheet M32 — Mineral Exploration within the Woomera Prohibited Area and Woomera Instrumented Range

Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the clearance of native vegetation clearance associated with the minerals and petroleum industry (September, 2005).

All available as free downloads from:

<http://www.pir.sa.gov.au>

STANDARDS AUSTRALIA:

HB203:2000 Environmental Risk Management - Principles and Process

AS 3806:2006 Compliance Programs

AS/NZS 4360:1999 Risk Management

AS/NZS ISO 14001:1996 – Environmental Management systems – Specification with Guidance for use

LEADING PRACTICE SUSTAINABLE DEVELOPMENT PROGRAM FOR THE MINING INDUSTRY SERIES

1. Overview
2. Community Engagement and Development
3. Mine Rehabilitation
4. Mine Closure and Completion
5. Stewardship
6. Biodiversity Management
7. Managing Acid and Metalliferous Drainage
8. Tailings Management
9. Working with Indigenous Communities
10. Cyanide management
11. Water Management
12. Hazardous Materials Management
13. Particulate, Noise and Blast Management
14. Monitoring, Auditing and Performance
15. Risk Assessments and Management

<http://www.industry.gov.au/sdmining>

MINERALS COUNCIL OF AUSTRALIA

Enduring Value: Guidance for implementation (2004)

Enduring Value resource database

Available at www.minerals.org.au

MINISTERIAL COUNCIL ON MINERALS AND PETROLEUM RESOURCES

Strategic Framework for Mine Closure (2000)

Strategic framework for tailings management (2001)

Principles for engagement with communities and stakeholders (2005)

Baseline Environmental Guidelines for New and Existing Mines ANZMEC Report 95.02 (1995)

Strategic water management in the minerals industry (2005)

Available as free downloads from <http://www.industry.gov.au/mcmpr>

PLANT PESTS AND DISEASES:

"Code for control of Branched Broomrape" 2003

Available as free download from:

<http://www.dwlbc.sa.gov.au/>

"Phytophthora Management Guidelines" 2003 available as free download from

<http://www.environment.sa.gov.au>

APPENDIX 1: DEFINITIONS AND ABBREVIATIONS (FOR THE PURPOSE OF THESE GUIDELINES)

Attenuation — see definition of natural attenuation

Baseline environmental study — a study undertaken to identify the state of the environment prior to any disturbance from mining. It aims to give a pre-mining inventory of factors such as the diversity of flora and fauna and quality of air or water. The values established during the study can be used as a benchmark for final mine rehabilitation.

Community (including local and affected community) — a community is a group of people living in a particular area or region. In mining industry terms, 'community' is generally applied to the inhabitants of immediate and surrounding areas who are affected by a company's activities.

The term 'local' or 'host community' is usually applied to those living in the immediate vicinity of an operation, being indigenous or non-indigenous people, who may have cultural affinity or claim, or direct ownership of an area in which a company has an interest.

'Affected community' refers to the members of the community affected by a company's activities. The effects are most commonly social (resettlement, changed services such as education and health), economic (compensation, job prospects, creation of local wealth), environmental and political. Whilst the economic and associated social impacts of a company may be extensive and operate at provincial, state or national levels, these broader impacts would not typically be used to define the affected community.

Community Stakeholders are those within the community that have an interest in a particular decision, either as individuals or representatives of a group. This includes people who do or can influence a decision as well as those affected by it. They might include:

- Local or host community members i.e. those in the immediate vicinity who may have a cultural affinity with or a claim to or direct ownership of an area affected by an operation.
- Affected community members i.e. members of the community affected by a company's activities in regards to social, economic, environmental and political issues. Broader provincial, state or national impacts are not used to define an affected community.
- Others eg NGO's government, shareholders and employees.

All these groups may include individuals with differing value systems, protocols and customs.

Conservation status — as defined in the *National Parks and Wildlife Act 1972*.

Consultation — the act of providing information or advice on, and seeking responses to, an actual or proposed event, activity or process.

DEH — Department of Environment and Heritage (SA).

DEWHA – Department of the Environment, Water, Heritage and the Arts (Australian Government)

DWLBC — Department of Water, Land and Biodiversity Conservation (SA).

Engagement — at its simplest, ‘engagement’ is communicating effectively with the people who affect and are affected by a company’s activities (its stakeholders). A good engagement process typically involves identifying and prioritising stakeholders, conducting a two-way dialogue with them to understand their particular interest in an issue and any concerns they may have, exploring with them ways to address these issues, and providing feedback to stakeholders on actions taken. At a more complex level, ‘engagement’ is a means of negotiating agreed outcomes over issues of concern or mutual interest.

Environment — includes:

- public health and well being
- public safety
- amenity values
- built infrastructure and land use
- cultural and heritage issues
- physical environment (soil, landforms, air, water, organisms, plants and ecosystems)
- areas within the lease area and all areas outside the lease area that may be significantly affected by the operation.

EPA — Environment Protection Authority (SA).

Floristic association — a plant community characterised by definite floristic and sociological (organisational) features that shows, by the presence of diagnostic species, a certain independence.

Geological monument — a site that shows features of such outstanding geological or geomorphological significance that it is considered by the community of earth scientists to be worthy of conservation.

ISR – In Situ Recovery (also known as In Situ Leach)

Karst formation — is found where most of the drainage is underground, due to greater solubility of certain rocks in natural waters. The dissolving actions of water on limestone results in a distinctive landscape defined by depressions such as sinkholes, caves, holes and solution pipes.

MARP — Mining and Rehabilitation Program.

MCA — Minerals Council of Australia.

MCMPR — Ministerial Council on Mineral and Petroleum Resources.

MPL — Miscellaneous Purposes Licence.

Natural attenuation — The process where groundwater, which has been altered through the addition of leach solution or liquid waste, reverts through reaction to its surrounding aquifer matrix and pre-existing groundwater over a period of time to or towards its pre-contaminated state, without additional attenuating treatment. (from “*Review of environmental impacts of the acid in-situ leach uranium mining process*”, CSIRO, 2004)

Native vegetation — vegetation that occurs naturally in an area, but does not include vegetation intentionally planted by another person.

Noise — Sound, especially of a loud or harsh kind, which also includes vibration (EPA, 1993).

Nuisance —

- (a) any adverse effect on an amenity value of an area that:
 - (i) is caused by noise, smoke, dust, fumes or odour; and
 - (ii) unreasonably interferes with or is likely to interfere unreasonably with the enjoyment of the area by persons occupying a place within, or lawfully resorting to, the area; or
- (b) any unsightly or offensive condition caused by waste (EPA, 1993).

Objectives — statement of the specific goals for protection of identified environmental values affected by the proposed or current mining activities, including assessment criteria and agreed between the proponent and/or company and stakeholders.

Old growth vegetation — vegetation community that contains significant amounts of its oldest growth stage, usually senescing trees in the upper stratum, and has been subject to negligible disturbance.

Overburden — material overlying a mineral ore deposit up to but not including the topsoil.

Risk — the possibility of an event occurring that impacts negatively on the environment, taking into account the natural resilience of the environment or proposed management strategies. Risk is a combination of likelihood of the event occurring and the consequence should it occur.

RPD — Radiation Protection Division (of the EPA).

Scattered trees — naturally occurring indigenous trees (commonly eucalypts), usually two or more metres in height, that occur over little or no native understorey, and with a spatial arrangement varying from that considered to be close to the original distribution (pre-European settlement) to that which is highly altered and very sparsely distributed or, less frequently, crowded in unnaturally dense even-aged patches due to extensive clearance and/or past land management activities. In certain circumstances, trees less than 2 m may be considered to be scattered trees (e.g. mature mallee trees); conversely, some species may be considered saplings at greater than 2 m.

SEB (Significant Environmental Benefit) — unless clearance is of a very minor nature, an approval must be subject to conditions that will result in an SEB. This may

include establishing a 'set aside' area — an area that is fenced and managed, including the exclusion of stock, where natural regeneration of native vegetation may take place or replanted with native vegetation (using local native plant seeds suitable for the site involved). Alternatively, there may be a condition for an existing area of bushland on the property to be fenced and protected, possibly under a Heritage Agreement. If it is not possible to achieve an SEB on a property, a landowner has the option of making a payment into the Native Vegetation Fund. Any payment will be used by the Native Vegetation Council to achieve a SEB elsewhere in the region.

Significant trees — under the Development Act, trees that occur in a designated area (usually metropolitan areas) and meet specified circumference and height criteria, or have been specifically identified as significant within a local council development plan.

Stakeholder — At Earth Summit 2002, stakeholders were defined as 'those who have an interest in a particular decision, either as individuals or representatives of a group. This includes people who influence a decision, or can influence it, as well as those affected by it'. Stakeholders might include local community members, non-government organisations, governments, shareholders and employees.

Subsoil — the soil encountered between topsoil and overburden that is capable of maintaining vegetative growth.

Topsoil — the surface soil of land in its natural state, containing carboniferous material, distinguishable from subsoils and overburden.

Waste (excluding waste rock, overburden and the contents of tailings dams) — any solid, liquid or gas (or combination thereof) that is a left over, surplus or unwanted by-product from any business or domestic activity, whether of value or not.

Weed species — any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in South Australia.

APPENDIX 2: EXAMPLES OF ENVIRONMENTAL, SOCIAL AND ECONOMIC ASPECTS

Note: This list is provided for guidance only and is not intended to be exhaustive. Each Proposal will need to be assessed individually to ascertain its potential environmental and social consequences.

Aspect of environment	Category of impact	Type of event	Likely consequences
Natural environment	Soil impact	<i>Removal and stockpiling of topsoil</i>	<i>Reduction in ability for land to sustain pastoral activities</i>
		<i>Change of soil quality (e.g. contamination due to spills, salinisation)</i>	<i>Increased erosion. Reduction in soil fertility, public health risk.</i>
	Landscape stability	<i>Initiation of landslides</i>	<i>Flooding, damage to waterways, ecosystems.</i>
	Air impacts	<i>Emissions to air (e.g. dust, smoke, greenhouse gases).</i>	<i>Damage to flora and fauna. Greenhouse effect.</i>
	Surface and groundwater impacts	<i>Water extraction.</i>	<i>Water shortage to local community, agriculture and ecosystem.</i>
		<i>Injection of mining fluids into aquifer.</i>	<i>Water not suitable for pastoral use, spring fed ecosystems damaged.</i>
		<i>Altering drainage patterns.</i>	<i>Reduced water capacity of natural water bodies. Ecological damage. Increased soil erosion.</i>
	Fauna impacts	<i>Disturbing terrestrial or aquatic species.</i>	<i>Endangering or displacing species.</i>
		<i>Disturbing animal habitats.</i>	<i>Changes to fauna patterns. Barriers to fauna movements.</i>
	Flora impacts	<i>Disturbing native flora.</i>	<i>Threaten biological diversity.</i>
		<i>Clearing native vegetation.</i>	<i>Destroy fauna habitats. Threaten biodiversity.</i>
	Sensitive area impacts	<i>Disturbance of National or Conservation Parks.</i>	<i>Loss of conservation value.</i>

Aspect of environment	Category of impact	Type of event	Likely consequences
		<i>Disturbance of World Heritage areas.</i>	<i>Loss of world heritage value of area.</i>
		<i>Disturbance of areas under national or international registers or conventions.</i>	<i>Loss of register or convention values</i>
Social environment	Community resource impacts	<i>Use of public resources.</i>	<i>Degradation of public infrastructure and resources (e.g. road or water supplies).</i>
		<i>Change in land use.</i>	<i>Reduces economic capacity of local community.</i> <i>Loss of recreational amenity of a region.</i>
	Dust, visual amenity	<i>Change visual attributes of area.</i>	<i>Reduction in aesthetic and recreational value of area.</i>
	Fires	<i>Uncontrolled fire escapes lease area.</i>	<i>Deaths or injuries to public; widespread economic loss.</i>
	Noise and vibration	<i>Blasting and other noise causes disturbance to nearby residents.</i>	<i>Reduced public amenity and health.</i>
	Heritage impacts	<i>Disturbance to natural or man-made features of an area.</i>	<i>Changes to aesthetic value of area.</i> <i>Changes to historical value of area.</i>
		<i>Disturbance to Aboriginal sites (both archaeological and cultural).</i>	<i>Loss of Aboriginal affiliation with an area.</i>
	Community health impacts	<i>Air emissions.</i>	<i>Health problems in the community.</i>
		<i>Noise and vibration.</i>	<i>Discomfort to local community.</i>
		<i>Water contamination.</i>	<i>Health risk to local community.</i>
		<i>Slope stability.</i>	<i>Damage to public property.</i>
Economic environment	Natural resource impacts	<i>Disturbance of natural resources of other industries in the region (e.g. fish habitats associated with local fishing industry).</i>	<i>Changes in employment levels.</i> <i>Changes in level of viability of other industries.</i>

Aspect of environment	Category of impact	Type of event	Likely consequences
		<i>Altering existing land use.</i>	<i>Changes to land value and industry types within region.</i>

APPENDIX 3: SCHEDULE 4 OF THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION REGULATIONS 2000

Matters To Be Addressed By Draft Public Environment Report And Environmental Impact Statement

1 General information

- 1.01 The background of the action including:
- (a) the title of the action;
 - (b) the full name and postal address of the designated proponent;
 - (c) a clear outline of the objective of the action;
 - (d) the location of the action;
 - (e) the background to the development of the action;
 - (f) 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;
 - (g) the current status of the action;
 - (h) the consequences of not proceeding with the action.

2 Description

- 2.01 A description of the action, including:
- (a) all the components of the action;
 - (b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;
 - (c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;
 - (d) relevant impacts of the action;
 - (e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;
 - (f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action;
 - (g) to the extent reasonably practicable, any feasible alternatives to the action, including:
 - (i) if relevant, the alternative of taking no action;
 - (ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action;
 - (iii) sufficient detail to make clear why any alternative is preferred to another;
 - (h) any consultation about the action, including:
 - (i) any consultation that has already taken place;
 - (ii) proposed consultation about relevant impacts of the action;
 - (iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation;

- (i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

3 Relevant impacts

3.01 Information given under paragraph 2.01 (d) must include:

- (a) a description of the relevant impacts of the action;
- (b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;
- (c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- (d) analysis of the significance of the relevant impacts;
- (e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4 Proposed safeguards and mitigation measures

4.01 Information given under paragraph 2.01 (e) must include:

- (a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;
- (b) any statutory or policy basis for the mitigation measures;
- (c) the cost of the mitigation measures;
- (d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;
- (e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;
- (f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent.

5 Other approvals and conditions

5.01 Information given under paragraph 2.01 (f) must include:

- (a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:
 - (i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;
 - (ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;
- (b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;
- (c) a statement identifying any additional approval that is required;

- (d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

6 Environmental record of person proposing to take the action

- 6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:
 - (a) the person proposing to take the action; and
 - (b) for an action for which a person has applied for a permit, the person making the application.
- 6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7 Information sources

- 7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:
 - (a) the source of the information; and
 - (b) how recent the information is; and
 - (c) how the reliability of the information was tested; and
 - (d) what uncertainties (if any) are in the information.