# Appendix 2
# EIS guidelines

ntepa
Northern Territory
Environment Protection Authority

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

# GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

# RANGER 3 DEEPS UNDERGROUND MINE

## ENERGY RESOURCES OF AUSTRALIA LTD

August 2013

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# 1 Introduction

The Proponent, Energy Resources of Australia Ltd, proposes to develop and operate the Ranger 3 Deeps Underground Mine at the existing Ranger Uranium Mine in the Alligator Rivers Region, Northern Territory.

The Ranger 3 Deeps resource is estimated to contain approximately 34,000 tonnes of uranium oxide[1] and is in effect the underground continuation of the Ranger Pit 3 deposit, which was mined using open-pit methods between 1997 and 2012. Active extraction of ore from near-surface deposits at the Ranger Uranium Mine ceased in December 2012. The current processing of ore under the existing operations is from stockpiles at the site. The Ranger 3 Deeps resource was defined by a series of successive surface diamond drilling programs between 2005 and 2009 and will continue to be defined through activities associated with the exploration decline, which is currently under construction.

Ranger 3 Deeps Underground Mine would be accessed by a 3km decline, to a working depth of greater than 400m, and mined via a series of stopes excavated by drilling and blasting, with the total length of all underground workings to reach 17km (based on conceptual modelling).

The Proponent proposes to transport the mined material from the underground workings to the surface and to use the existing processing plant and related surface facilities at the Ranger Uranium Mine for ore processing. The Proponent anticipates that the combined quantity of material (ore) entering the processing plant from both the Ranger 3 Deeps Underground Mine and existing low grade ore stockpiles would be similar to the feed quantity for the existing operations.

The development, operation and closure of the Ranger 3 Deeps Underground Mine would not alter the current operating or closure and rehabilitation timeline for the Ranger Uranium Mine. Mining and ore processing at the Ranger Uranium Mine would be completed by January 2021 with site rehabilitation activities occurring within the period 2021 to 2026.

On 16 January 2013, the Northern Territory Environment Protection Authority (NT EPA) received the Notice of Intent for the Ranger 3 Deeps Underground Mine for consideration under the *Environmental Assessment Act* (EA Act). On 13 March 2013, the NT EPA decided that the Ranger 3 Deeps Underground Mine proposal required assessment under the EA Act at the level of an Environmental Impact Statement (EIS).

Issues contributing to the decision included:

- uncertainty around the scope of the proposal in relation to the scale, operational factors, timeframes and complexity of all components with respect to the current operations, including closure activities, at the Ranger Uranium Mine;
- potential impacts to regional water resources, and dependent ecosystems, from the development, operation and closure of the Ranger 3 Deeps Underground Mine;
- creation of new radiation risks with the potential to increase exposure and associated health risks to employees, the public and the environment;
- potential risks relating to the environment and public safety from the transportation of uranium, explosives (bulk emulsion) and consumables, including dangerous goods, on public road;

[1] A pre-feasibility study is currently being conducted by the Proponent to determine the conversion rate from the estimated 34,000 tonne resource to a mineable reserve.

- localised impacts from the ventilation and fan exhausts with respect to noise, amenity, and areas of deposition and accumulation of dusts and contaminants from the underground operations on surface soils and vegetation, including bush foods;
- uncertainties associated with the processing of the Ranger 3 Deeps ore and associated management of water, tailings and waste streams;
- potential impacts to stakeholders; and
- potential social, cultural and economic impacts, including the risks of the project not realising its projected economic and social benefits.

Assessment at the level of an EIS was considered necessary as the activities associated with the Ranger 3 Deeps Underground Mine would occur adjacent to the World Heritage and Ramsar listed Kakadu National Park (KNP). KNP is a region of high regional, national and international significance for both its cultural and natural properties and values. The proposal to mine and process the Ranger 3 Deeps resource at the current Ranger Uranium Mine has the potential to pose additional risks to the environment including the World Heritage listed attributes of KNP and of the Ramsar wetlands, as well as to the amenity and traditional practices of the people living in and around Jabiru and downstream locations.

Uranium mining more broadly is of high interest to the community in the Alligator Rivers Region. The Proponent, and its operations at the Ranger Uranium Mine, will continue to remain the focus of considerable community awareness and public interest.

On 16 January 2013, the Ranger 3 Deeps Underground Mine proposal (EPBC 2013/6722) was referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (the Commonwealth Minister) and on 13 March 2013 was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The proposed action has the potential to have a significant impact on the following Matters of National Environmental Significance (NES) that are protected under Part 3 of the EPBC Act:

- World Heritage properties (sections 12 & 15A);
- National Heritage places (sections 15B & 15C);
- Wetlands of international importance (sections 16 & 17B);
- Listed threatened species and communities (sections 18 & 18A);
- Listed migratory species (sections 20 & 20A);
- Protection of the environment from nuclear actions (sections 21 and 22A); and
- Commonwealth land (sections 26 & 27A).

On 13 March 2013, a delegate for the Commonwealth Minister determined that the proposal will be assessed at the level of an EIS.

These Guidelines have been developed to assist the Proponent in preparing an EIS for the Ranger 3 Deeps Underground Mine, in accordance with Clause 8 of the NT Environmental Assessment Administrative Procedures, and to meet the requirements as provided for in Chapter 4, Part 8, Division 6 of the EPBC Act.

# 2 General Advice on EIS

## 2.1 General Content

The EIS should be a stand-alone document. It should contain sufficient information to avoid the need to search out previous or additional, unattached reports.

The EIS should enable interested stakeholders, the Commonwealth Minister and the NT EPA to understand the environmental consequences of the proposal. Information provided in the EIS should be objective, clear, succinct and easily understood by the general reader. Maps (using an appropriate scale, resolution and clarity), plans, diagrams and other descriptive detail should be included. Wherever possible, technical jargon should be avoided or accompanied by a clear explanation so that it is readily understandable. Cross-referencing should be used to avoid unnecessary duplication of text.

The level of analysis and detail in the EIS should reflect the level of significance of the potential impacts on the environment, as determined through adequate technical studies. Consideration of appropriate spatial, temporal and analytical scales should be used to clearly communicate the potential impacts on the environment. Where data are used to support statements, studies and claims in the EIS, reliability of the data and an explanation of the sampling criteria and approach should be provided. All known and unknown variables, limitations or assumptions made in the EIS must be clearly stated and discussed.

Information materials summarising and highlighting risks of the proposal should be provided in a culturally appropriate format and language, where relevant. This should be accompanied by graphics and illustrations that assist with interpretation, where appropriate.

## 2.2 Structure, Format and Style

The EIS should comprise of three elements:

1. Executive summary

The executive summary must include a brief outline of the proposal and each chapter of the EIS, allowing the reader to obtain a clear understanding of the proposed action, its environmental implications and management objectives. It must be written as a stand-alone document, able to be reproduced on request by interested parties who may not wish to read the EIS as a whole.

2. Main text of the document

The main text of the EIS should include a list of abbreviations, a glossary to define technical terms, acronyms, abbreviations, and colloquialisms. The document should consist of a series of chapters detailing the level of significance and management of the potential impacts on the environment from the proposal.

3. Appendices

The appendices must include detailed technical information, studies or investigations necessary to support the main text. These will be made publicly available, including:

- A table listing how these Guidelines have been addressed in the EIS, cross-referenced to chapters, page numbers and/or appendices;
- An outline of the relevant legislation, codes, standards and guidelines applicable to the proposal;
- A list of persons and agencies consulted during the EIS;

- The names of, and work done by, the persons involved in preparing the EIS;
- The qualifications and experience of the people involved in work contributing to the EIS;
- A table listing commitments made by the Proponent; and
- Detailed technical information, studies or investigations necessary to support the main text.

The EIS must be written so that any conclusions reached can be independently assessed.

The EIS should be produced on A4 size paper capable of being photocopied, with any maps, diagrams or plans on A4 or A3 size paper, and in colour, if possible.

## 2.3 Referencing and Information Sources

All sources must be appropriately referenced using the Harvard Standard. The reference list should include the address of any internet pages used as data sources. All referenced supporting documentation and data, or documents cited in the EIS must be available upon request. For information given in the EIS, the EIS must state:

- The source of the information;
- How recent the information is;
- How the reliability of the information was tested; and
- What uncertainties (if any) are in the information.

All known and unknown variables or assumptions made in the EIS must be clearly stated and discussed. Confidence levels must also be specific, as well as the sources from which they were obtained. The extent to which a limitation, if any, of available information may influence the conclusions of the environmental assessment should be discussed.

The EIS must include information on any consultation about the proposal, including:

- Any consultation that has already taken place;
- Proposed consultation about relevant impacts of the proposal;
- If there has been consultation about the proposed action, any documented response to, or result of, the consultation; and
- Identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

The EIS has an important role in informing the public about this proposal. It is essential that the Proponent demonstrates how any public concerns were identified, and will influence the design and delivery of the proposal. Public involvement and the role of government organisations should be clearly identified. The outcomes of any surveys, public meetings and liaison with interested groups should be discussed including any changes made to the proposal as a result of consultation. Details of any ongoing liaison should also be discussed.

## 2.4 Administration

The Proponent should lodge ten bound hardcopies and an electronic (Adobe PDF format) copy of the EIS with the NT EPA and the Australian Government Department of

Sustainability, Environment, Water, Population and Communities (SEWPaC). The electronic copies should be provided both as a single file of the entire document and separate files of the document components. Additionally, a Microsoft Word copy of the EIS should be provided to facilitate the production of the Assessment Report.

The Proponent should consider the file size, format and style of the document appropriate for publication on the NT EPA website. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

The Proponent must receive the Commonwealth Minister's approval to publish the EIS, which must be published in accordance with Section 103 of the EPBC Act and Part 16 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations).

The Proponent is to advertise the EIS for review and comment in the NT News. The NT EPA requires the EIS document and a draft of the advertisement at least one week prior to advertising the draft EIS, to arrange web upload of the document and review and comment on advertising text.

If it is necessary to make use of material that is considered to be of a confidential nature, the Proponent should consult with the NT EPA and SEWPaC on the preferred presentation of that material, before submitting it to the Minister for approval for publication.

The Proponent should ensure that the EIS assesses compliance of the action with the objects of the EPBC Act and principles of Ecological Sustainable Development as set out in the EPBC Act (Attachment 1) and Schedule 4 of the EPBC Regulations (Attachment 2).

## 2.5 Public Exhibition

Sufficient copies of the EIS should be provided to and be made available for public exhibition at:

- NT EPA, 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Mines and Energy Information Centre, Department of Mines and Energy, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin;
- SEWPaC (Darwin office), cnr Pederson Rd and Fenton Ct, Darwin International Airport, Darwin;
- Jabiru Public Library, 13 Tasman Cres, Jabiru;
- Northern Territory Library, Parliament House, Darwin;
- The Environment Centre NT, Unit 3, 98 Woods St, Darwin;
- Northern Land Council West Arnhem, 3 Government Building, Flinders St, Jabiru;
- Northern Land Council Head Office, 45 Mitchell St, Darwin; and
- Gundjeihmi Aboriginal Corporation, 5 Gregory Place, Jabiru.

The public exhibition period for the draft EIS will be in the order of ten (10) weeks. The EIS exhibition period should not occur in late December or January in any year to ensure optimal opportunity for public and Government viewing of the EIS document. Additional time will be added to the EIS exhibition period if the EIS exhibition overlaps any Christmas and January periods.

# 3 Description of the Proposal

## 3.1 General Information

Provide the background and context of the proposal including:

- The title of the proposal;
- The full name and postal address of the Proponent;
- The location of the proposal in the region and its proximity to:
    - landmark features;
    - sites of cultural significance;
    - sites of social significance;
    - regional community centres; and
    - sensitive environments, such as major waterways, significant groundwater resources, significant natural features and conservation reserves.
- Climate and atmospheric characteristics relevant to the proposal (e.g. air quality, seasonal temperatures, humidity, wind, evaporation, extreme events and rainfall);
- How the proposal relates to any other proposals or actions (of which the Proponent should reasonably be aware) that have been or are being taken, or that have been approved in the region;
- The background to the development of the proposal, including discussion of previous environmental impact assessment and overview of historic mining activities;
- An explanation and outline of the objectives, benefits and justification for the proposal;
- Identification of areas of Ranger 3 Deeps deposit that are part of the Ranger 3 Deeps exploration program, which may be mined in future;
- A summary of current agreements between the Proponent and the Northern Territory Government, and/or the Australian Government, and/or other stakeholders;
- Details of the Proponent's environmental record, including 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 the Proponent, and details of systems and processes that have been subsequently upgraded;
- National and Northern Territory standards, codes of practice and guidelines relevant to the proposal;
- Relevant industry standards and guidelines used; and
- The consequences, both positive and negative, of not proceeding with the proposal.

## 3.2 Approvals and Conditions

The EIS must include information on any other requirements for approval or conditions that apply, or that the Proponent reasonably believes are likely to apply, to the proposed action. This must include:

- A description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the EPBC Act or EA Act), including any conditions that apply to the action;
- A statement identifying any additional approval that is required; and
- A description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

## 3.3 Proposal Components

The EIS should identify all the processes and activities intended for the Ranger 3 Deeps Underground Mine and associated ancillary activities, during the life of the proposal. As background to discussion of specific components, the following should be included:

- A description of the environment of the proposed site and the surrounding areas that may be affected by the action;
- The current status of the proposal;
- An overview of the proposal schedule associated with construction, operation and closure. This should include a summary of the life-of-mine schedule/timeline for the current Ranger Uranium Mine and the Ranger 3 Deeps Underground Mine, including the targeting of each section of the Ranger 3 Deeps resource;
- An outline of the geology of the area including:
    - the results of studies and surveys undertaken to identify the extent of the mineral resource or ore reserve within the area;
    - geological properties of the site; and
    - characterisation of the orebody and waste rock.
- Delineation of the proposal footprint using detailed maps and diagrams, including:
    - locations of existing infrastructure and mine components;
    - locations of existing water extraction points and storage facilities;
    - location of the resource/s to be explored, developed, mined and included in mine closure and rehabilitation activities;
    - all areas to be cleared or disturbed, both for the life of the proposal and temporarily; and
    - the location of any works to be undertaken, structures to be built or elements of the proposal, including but not limited to:
        - the mine;
        - paste-fill plant;
        - vent raises;
        - hard stands; and
        - product export or transhipment facilities.

### 3.3.1 Mine

Provide specific details of the following aspects of construction:

- Timetable for construction including staging of construction activities;
- Methods of mine construction;
- Volumes of materials required, including, but not limited to, consumables such as bulk chemicals and fuel; and
- Plant and machinery required.

Provide specific details of the following:

- Mining types and methods, including the major equipment to be used in the various components of the operation;
- Handling and stockpiling of waste rock and materials;
- Quantity of material to be mined annually, including any proposed ramping up of production or staging of development; and
- Confirmation of the volumes of ore already extracted from the Ranger Uranium Mine for comparison against the proposed additional ore extraction volumes.

### 3.3.2 Processing

Provide relevant information with respect to the processing circuit, including but not limited to:

- Transport of materials to the processing circuit;
- Processing methods, including the major equipment to be used in the various components of the processing operation, where appropriate;
- The methods proposed for processing of the ore body;
- Water requirements, treatment and sources;
- Volumes of materials required, including, but not limited to, consumables such as bulk chemicals and fuel; and
- Beneficiation.

A detailed discussion of how the processing of ore from the Ranger 3 Deeps Underground Mine differs from the current processing at the Ranger Uranium Mine should be provided, including the use of acids, alkalis and other chemicals.

### 3.3.3 Transport and Consumables

Identify proposed routes for transport to and from the underground mine, of construction materials, consumables, personnel and product for the proposal, including use of existing roads and airfields.

Details of the road network and any access track construction or upgrade should be provided, including:

- Maximum width of road corridors required for construction;
- Plant and machinery required;
- Vegetation clearing methods and disposal of plant matter following clearing;
- Timeframes for access track construction and upgrade;
- Source of construction inputs and materials; and

- Ongoing provisions for road and access track maintenance, including source and extraction of maintenance inputs and materials.

Details of road use associated with the proposed activity should be provided including:

- Type, size and number of vehicles required during all phases of the proposal;
- Estimated frequency of proposal-related vehicle use on public roads;
- Quantities of materials to be transported to the mine (e.g. heavy machinery, equipment, diesel, hazardous materials such as sulfuric acid); and
- Hours of operation.

Describe operational aspects of the facilities, including:

- Product handling requirements, including storage and laydown areas;
- Hazardous materials storage;
- Water storage (ponds or tanks) and/or groundwater extraction requirements;
- Operational hours/days; and
- Lighting.

### 3.3.4 Water

Provide information on the quantity, quality, source (groundwater and/or surface water), storage, and infrastructure requirements for water use, including a water balance, for both construction and operational aspects of the proposal. Include:

- Dust suppression;
- Drinking water;
- Ablutions and sewage treatment;
- Waste (mine and process) water;
- Processing circuit; and
- Any other uses.

### 3.3.5 Energy

Provide relevant information with respect to energy, including but not limited to:

- Information on the proposal energy requirements, including mining fleet fuels and electricity demand both onsite and at the accommodation village;
- Details of energy requirements (type of equipment, fuel use);
- Details of energy infrastructure requirements, for all components of the proposal, including fuel storage;
- Describe any initiatives proposed to improve energy efficiency and/or reduce emissions to air; and
- An inventory of any emissions to air and their management during the proposal.

### 3.3.6 Stockpile Management

Provide a detailed description of the type (e.g. cut-off grades), storage and management of the stockpiled materials at the Ranger Uranium Mine.

### 3.3.7 Waste Management

Provide relevant information with respect to waste management, including but not limited to:

- Descriptions of predicted waste streams, both industrial and domestic, including solid and liquid wastes at the mine site, camp site and other relevant locations both during construction and operational phases of the proposal;
- Information on potentially hazardous materials to be used or produced and methods for storage, transport, handling, containment, disposal and emergency management of these materials (including fuel); and
- An inventory of any waste streams requiring management during the proposal.

### 3.3.8 Tailings Management

Provide relevant information with respect to tailings management, including but not limited to:

- Methods for managing tailings and associated process water, including volumes; and
- To provide context, clearly indicate the quantity of tailings that would be produced from the underground mine and how that may impact the overall Integrated Tailings and Water Closure Strategy e. g. Detail any changes in the total volume and timing of tailings proposed to be transferred into Pit 3.

### 3.3.9 Noise

Provide relevant information with respect to noise, including but not limited to:

- The expected noise levels associated with the proposal construction and operation, including timing and duration, in comparison to levels associated with the existing operation, sensitive receptors and nominated noise criteria and standards; and
- Describe the management of relevant noise impacts.

### 3.3.10 Air Quality

Provide relevant information with respect to air quality, including but not limited to:

- A description of the sources and projected quantities of greenhouse gases emitted by the proposal;
- A description of the sources and projected quantities of radioactive gases and particulates emitted by the proposal; and
- Discuss dust suppression strategies and monitoring of potential dust impacts, including reporting requirements and compliance with relevant health standards.

### 3.3.11 Workforce and Accommodation

Provide relevant information with respect to the workforce and accommodation, including but not limited to:

- Details of the estimated number of people to be employed, skills base required, and likely sources (local, regional, overseas) for the workforce during construction, operational and closure/rehabilitation phases;
- Information on the potential overflow into commercial accommodation; and
- Discuss arrangements for transport of workers to and from project areas, including air services required.

### 3.3.12 Ancillary Infrastructure

Provide construction and operational information regarding ancillary infrastructure, including, but not limited to:

- Telecommunications; and
- any existing ancillary infrastructure that could be used by the proposal.

### 3.3.13 Closure and Rehabilitation

Discuss the various aspects of proposed progressive and final rehabilitation of disturbed areas associated with the Ranger 3 Deeps Underground Mine, including:

- Proposed staging and timing;
- How the proposal will be incorporated within the final landform design for the existing operation, including the design approach and methodology used, and any voids or landscape depressions to be left at cessation of mining;
- The rehabilitation techniques to be used and the final topographic and drainage morphology;
- The proposed revegetation program, with selection and collection of local native species e.g. native grasses and other vegetation;
- Other preparations required for rehabilitation (seed harvesting, seedling generation);
- Groundwater influences, including the long term predicted hydrology;
- Water supply; and
- Post closure and rehabilitation monitoring.

## 3.4 Alternatives

The EIS should describe any feasible alternatives to carrying out the proposed action, including how it complies with the principles and objectives of ecologically sustainable development (Attachment 1).

Alternatives should include:

- Not proceeding with the proposal;
- Site selection for mine and processing components;
- Mining methods;
- Management of wastes;
- Water management;
- Rehabilitation methods;

- Energy sources for power generation, including renewable energy sources;
- Alternative processes, methods and lifecycle; and
- Consideration of alternative environmental management measures for key risks/impacts.

Discussion should include:

- Sufficient detail to make clear why a particular alternative is preferred to another;
- Adverse and beneficial effects (direct and indirect) of alternatives at national, territory, regional and local levels and their distributional impact;
- The comparison of short (whilst operational), medium (post closure) and relevant long term advantages and disadvantages of the options; and
- A comparative description of the potential impacts associated with each viable alternative on NES matters protected by controlling provisions of Part 3 of the EPBC Act for the action.

# 4 Risk Assessment

## 4.1 Risk Assessment Approach

The EIS should be undertaken with specific emphasis on the identification, analysis and mitigation of risks through a whole-of-project risk assessment. Through this process, the EIS will:

- Identify and discuss the full range of risks presented by the proposal, including those of special concern to the public;
- Identify relevant impacts;
- Quantify and rank risks so that the reasons for proposed management responses are clear;
- Identify levels of any uncertainty about estimates of risk and the effectiveness of risk controls in mitigating risk;
- Explicitly identify those members of the community expected to accept residual risks and their consequences, providing better understanding of equity issues; and
- Demonstrate that the proposal represent best practicable technology.

Statements about levels of uncertainty should accompany all aspects of the risk assessment. Steps taken to reduce uncertainty or precautions taken to compensate for uncertainty should be identified and their effect/s demonstrated.

Information provided should permit the reader to understand the likelihood and potential severity of each risk presented by the proposal, and any uncertainty around these risks, as well as any uncertainty about the effectiveness of controls. Levels of uncertainty that preclude robust quantification of risk should be clearly acknowledged.

Risk rankings assigned should be fully justified. Where a risk score associated with the likelihood or consequence of an impact is reduced as a result of proposed mitigation measures, clear justification should be provided for the reduction in score. The adequacy and feasibility of mitigation measures must be demonstrable.

Sufficient quantitative analysis should be provided to indicate whether risks are likely to be acceptable or tolerable. A comparison can be made with similar ventures in Australia and internationally. Assumptions used in the analyses should be explained. Relevant standards, codes and best practice methodologies that minimise risks should be discussed.

The risk assessment should be based on best practice. Processes for risk management are formalised in Standards Australia / Standards New Zealand (e.g. AS/NZS ISO 31000:2009; HB 436:2004; HB 158:2010; HB 203:2012).

A number of key risks have been identified through a preliminary assessment of the proposal. Each of the identified risks should be addressed by the Proponent in the risk assessment and management process.

Additionally, it is expected that further risks will be identified through the comprehensive risk assessment process required for the EIS. These should also be addressed and appropriate management initiatives be developed.

Where relevant, describe how applicable standards, codes and best practice that minimise risk and describe how the application of this guidance material has been utilised by other projects dealing with similar potential risks and their identified impacts.

The construction, operation and rehabilitation of the Ranger 3 Deeps Underground Mine should not compromise the existing Environmental Requirements (Attachment 3) for the Ranger Uranium Mine.

## 4.2 Cumulative Impacts

Cumulative impacts can arise from compounding activities of a single operation or multiple mining and processing operations, as well as the aggregation and interaction of mining impacts with other past, current and future activities that may not be related to mining.

An assessment of cumulative environmental impacts should be undertaken that considers the potential impact of a proposal in the context of existing developments and reasonably foreseeable future developments to ensure that any potential environmental impacts are not considered in isolation. The extent of cumulative impacts to be considered depends upon the nature of the environmental issue. The risk assessment should consider and discuss cumulative assessment where relevant and account for impacts on an appropriate scale, such that:

- Landscape change originates not only from single projects and management actions, but also from complex and dynamic interactions of multiple past, present and future management actions; and
- Biophysical, social and economic change accumulates through additive or interactive (or synergistic) processes. The aggregate impact of multiple actions on the environment can be complex and may result in impacts that are more significant because of interactive processes; and
- Any given action does not operate in isolation. The most significant changes are often not the result of the direct effects of an individual action, but from the combination of multiple minor effects over the accumulation of time.

## 4.3 Human Health and Safety

### 4.3.1 Key Risks

The risk assessment should consider all aspects associated with the construction, operation, maintenance and decommissioning of the proposal that may potentially result in impacts to human health and safety.

### 4.3.2 Objectives

The EIS should include a detailed assessment of risks to demonstrate that:

- The Proponent is fully aware of any risks to human health and safety associated with all aspects of the proposal;
- The prevention and mitigation of risks to human health and safety are properly addressed in the design specifications; and
- The risks can and will be managed effectively during the construction, commissioning, operation, and decommissioning and post-closure phase of the development.

### 4.3.3 Information Requirements

- Identify all hazards, including physical hazards, noise, emissions and radiation, as a consequence of the action; and
- Identify workers and any members of the general public, including their location and patterns of activity and occupation, with the potential for exposure to these hazards as a consequence of the action.

### 4.3.4 Assessment of Risks

Aspects to be discussed include:

- Health and safety risks for the workforce and the general public for the duration of the proposal including post-closure;
- Radiation risks for the workforce and the general public including an assessment of potential dose delivered via the consumption of bush foods;
- Potential risks relating to the environment and public safety from the transportation of uranium, explosives (bulk emulsion) and consumables, including dangerous goods, on public roads;
- General health and safety risks associated with the proposal including, but not limited to:
    - fire;
    - underground collapse;
    - hazardous materials exposure; and
    - safety risks to road users associated with increased traffic and use of the existing road networks.

### 4.3.5 Mitigation and Monitoring

Detail preventative, management, treatment and monitoring strategies used to minimise the impacts of the proposal on human health and safety. Outline environmental (including health and safety) management strategies necessary for human health and

safety, and describe how these strategies will be incorporated into existing operational management plans.

## 4.4 Water

### 4.4.1 Key Risks

The risk assessment should consider all potential impacts to water resources associated with the construction, operation and closure of the Ranger 3 Deeps Underground Mine that may cause adverse changes to the quantity and quality of surface and/or groundwater, or potentially impact regional hydrology and dependent ecosystems.

### 4.4.2 Objectives

The EIS should include a detailed assessment of any risks to demonstrate that for all stages of the proposal:

- The Proponent is fully aware of any risks to surface and/or groundwater resources and interruption of water flows associated with all aspects of the proposal;
- The prevention and mitigation of risks to surface and/or groundwater quality and surface water flows are adequately addressed; and
- Surface water and groundwater resources and environmental values[2] are protected both now and in the future, such that:
    - ecological health, land uses and the health and welfare of people are maintained;
    - the values for which KNP was inscribed on the World Heritage list are maintained;
    - the ecological character of the KNP Ramsar site is maintained; and
    - the natural biological diversity of aquatic and terrestrial ecosystems of the Alligator Rivers Region, including ecological processes, is maintained.

### 4.4.3 Information Requirements

- In order to address assessment of potential impacts to regional water resources, details relating to existing water resource conditions and monitoring should be included. This should include discussion and data relating to:
    - aquifer properties;
    - results from baseline and operational water quality and hydrology monitoring programs, where available and relevant; and
    - changes to surface and groundwater systems as a result of previous mining and mining-related activities.
- Provide a detailed description of site and regional surface water catchments, waterways, springs, wetlands and regional groundwater resources;
- Describe the environmental values of the surface waterways and groundwater of the area potentially affected;

[2] See Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australian and New Zealand, 2000)

- Describe water quality and flows, and any existing water users potentially impacted by the proposal;
- Discuss how the proposal will impact on the current water management practices;
- Indicate the location of groundwater extraction, processes and/or monitoring bores for the proposal with respect to any groundwater dependent natural features;
- Details of extracted groundwater, including treatment, storage, reuse and disposal options and impacts to the overall Ranger Uranium Mine water balance;
- Describe the geochemical characterisation of mined rock and tailings to allow an assessment of the likely quality and quantity of seepage water; and
- Describe site and, if relevant, regional hydrogeology to enable the prediction of potential impacts of the proposal on water resources and their features adjacent to mining areas, including drawdown cones and pollution pathways.

### 4.4.4 Assessment of Risks

Provide an assessment of any risk to relevant surface and/or groundwater resources at an appropriate spatial scale as a result of proposal activities. In particular, discuss:

- Potential to contaminate surface and/or groundwater resources as a result of any proposal components;
- Potential loss of containment resulting in an uncontrolled release of contaminants to surface and/or groundwater;
- The potential impacts to regional water resources, and dependent ecosystems, from the development, operation and closure of the Ranger 3 Deeps Underground Mine, and mine components (Section 3.3);
- Potential impacts to adjacent areas and vegetation, including surface water bodies, from the drawdown of groundwater, including the volume of groundwater expected to be intercepted and/or extracted during the proposal;
- Potential impacts to surface and/or groundwater quality from the backfill of stopes with cemented tailings;
- Any additional impacts to surface and/or groundwater resulting from changes to the Ranger Uranium Mine tailings storage and ore stockpiling strategy as a result of the proposal;
- The impact of extreme weather events; and

The influence of seasonality, such as wet season influences, should be discussed, where relevant. The risk assessment should give consideration to the short (whilst operational), medium (post closure and under institutional control) and long term (post-institutional control) timeframes of the proposal.

### 4.4.5 Mitigation

Detail preventative, management and treatment strategies used to minimise the potential impacts of the proposal on regional water resources and hydrological features. In particular, provide details of the following for all stages of the proposal:

- Measures to safeguard surface and groundwater resources and their environmental values, including dependant ecological communities. Measures

should include options for minimising water use, management and treatment of clean and contaminated water, including site stormwater, erosion and sediment control measures, and appropriate management of any acid sulfate soils excavated or exposed through mining;

- Demonstrate that tailings placed in backfilled stopes will be physically isolated from the environment such that any contaminants arising from the tailings will not result in any short (whilst operational), medium (post closure and under institutional control) or long term (post-institutional control) detrimental environmental impacts;
- Measures to reduce risks associated with underground mine and/or surface soil stability issues, if identified;
- Measures to manage groundwater in the event that inflow is of greater quantity and/or poorer quality than expected;
- Management of water during times of high/extreme rainfall events; and
- Proposed domestic wastewater (sewage) treatment processes.

Outline any environmental management strategies necessary for regional water resources, and describe how these strategies will be incorporated into existing operational management plans. Strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained.

### 4.4.6 Monitoring

Detail surface and groundwater quantity and quality reporting requirements and monitoring programs used to evaluate and report on the effectiveness of the mitigation measures (Section 4.4.5).

## 4.5 Flora and Fauna

### 4.5.1 Key Risks

The risk assessment should consider all environmental aspects associated with the construction, operation and closure of Ranger 3 Deeps Underground Mine that may result in adverse impacts to listed flora and fauna in the region of the proposal and includes listed threatened species and communities and listed migratory species that are protected under Part 3 of the EPBC Act and the NT *Territory Parks and Wildlife Conservation Act*.

The EIS must include a description of all of the relevant potential impacts of the proposed action on flora and fauna species. Relevant potential impacts are impacts that the action will have or is likely to have on a matter protected by a controlling provision (as listed above).

### 4.5.2 Objectives

The aim of this assessment is to demonstrate that:

- The Proponent is fully aware of any risks to flora and fauna (including species protected under Part 3 of the EPBC Act) associated with all aspects of the proposal;
- The prevention and mitigation of risks to flora and fauna (including species protected under Part 3 of the EPBC Act) are properly addressed in the design specifications.

- The risks can and will be managed effectively during the construction, commissioning, operation, and decommissioning and post-closure phase of the development;
- The values for which KNP was inscribed on the World Heritage list are maintained;
- The ecological character of the KNP Ramsar site is maintained; and
- The natural biological diversity of aquatic and terrestrial ecosystems of the Alligator Rivers Region, including ecological processes, is maintained.

### 4.5.3 General Information Requirements

- Details of vegetation community types occurring on and adjacent to the proposal location, particularly including any species of flora or fauna of conservation significance[3];
- Details of soils and topography on and adjacent to the proposal location;
- Details of flora and fauna studies/data and monitoring conducted on and adjacent to the proposal area; and
- Details of the area and location of any land to be cleared as a result of the proposal, including, but not limited to, descriptions of:
    - all vegetation communities to be cleared of native vegetation; and
    - drainage lines, watercourses, wetlands, and sensitive or significant vegetation communities that have the potential to be impacted by the proposed action.

### 4.5.4 Listed Threatened Species and Communities Information Requirements

#### 4.5.4.1 Description of the Environment

The EIS must describe the environment of the proposal site and the surrounding areas that may be significantly impacted by the action. The following information should be included:

- Details of listed threatened species and communities that are likely to be present in the vicinity of the site, including detail of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information on the listed threatened species and their habitat at the site (and in areas that may be impacted by the proposal). Show consideration of relevant recovery plans and/or general survey guidelines, including, but not limited to:
    - Yellow Chat (Alligator Rivers) (*Epthianura crocea tunneyi*) - Commonwealth conservation advice on *Epthianura crocea tunneyi* and Survey guidelines for Australia's threatened birds. EPBC Act survey guidelines 6.2;
    - Partridge Pigeon (eastern) (*Geophaps smithii smithii*) - *National Multi-species Recovery Plan for the Partridge Pigeon Geophaps smithii smithii, Crested Shrike-tit Falcunculus frontatus whitei, Masked Owl Tyto novaehollandiae kimberli and Masked Owl Tiwi Islands Tyto*

[3] Species protected under Part 3 of the EPBC Act and/or the NT *Territory Parks and Wildlife Conservation Act*.

*novaehollandiae melvillensis* 2004-2009 and *Survey guidelines for Australia's threatened birds. EPBC Act survey guidelines 6.2*;

- Northern Quoll (*Dasyurus hallucatus*) - *National Recovery Plan for the Northern Quoll Dasyurus hallucatus* and *Survey Guidelines for Australia's Threatened Mammals. EPBC Act Survey Guidelines 6.5*; and
- Plains Death Adder (*Acanthophis hawkei*) - *Commonwealth Conservation Advice on Acanthophis hawkei*.

#### 4.5.4.2 Relevant Potential Impacts

The EIS must include a description of the relevant potential impacts during the construction, operational and decommissioning phases of the proposal. The following information must be provided for listed threatened species:

- A detailed assessment of the potential impacts upon native fauna including consideration, where relevant, of vegetation clearance, habitat fragmentation, altered hydrology, water quality impacts, erosion and sedimentation impacting on creeks and wetlands, soil compaction, inappropriate/ineffective rehabilitation, groundwater contamination, impacts on surface and groundwater systems, waste material, risks associated with the transport or storage of hazardous chemicals, weed and pest invasion, noise and dust impacts. Species assessed must include, but are not limited to:
  - Yellow Chat (Alligator Rivers) (*Epthianura crocea tunneyi*);
  - Partridge Pigeon (eastern) (*Geophaps smithii smithii*);
  - Northern Quoll (*Dasyurus hallucatus*); and
  - Plains Death Adder (*Acanthophis hawkei*).
- A detailed assessment of any likely impact that the proposal may facilitate on listed threatened species at the local, regional, state, and national scale;
- A detailed assessment of the potential of the project to increase the presence of introduced and invasive species (both flora and fauna) in the region, and the potential impacts of such species. Show consideration of relevant Threat Abatement Plans[4], such as:
  - *Threat Abatement Plan for Predation by Feral Cats*;
  - *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs;*
  - *Threat Abatement Plan for the Biological Effects, including Lethal Toxic Ingestion, caused by Cane Toads; and*
  - *Threat Abatement Plan to reduce the Impacts on Northern Australia's Biodiversity by the Five Listed Grasses.*
- A statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- Analysis of the significance of the relevant impacts; and

[4] http://www.environment.gov.au/biodiversity/threatened/tap-approved.html

- Any technical data and other information used or needed to make a detailed assessment of the significance of relevant impacts.

### 4.5.5 Listed Migratory Species Information Requirements

#### 4.5.5.1 Description of the Environment

The EIS must describe the environment of the proposal site and the surrounding areas that may be affected by the action. The following information should be included:

- Details of listed migratory species that are likely to be present in the vicinity of the site, including detail of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information on the listed migratory species and their habitat at the site (and in areas that may be impacted by the project). Show consideration of any relevant recovery plans and/or general survey guidelines.

#### 4.5.5.2 Relevant Potential Impacts

The EIS must include a description of any relevant impacts during both the construction, operational and decommissioning phases of the project. The following information must be provided for listed migratory species:

- A detailed assessment of the presence and potential impacts upon migratory species including consideration, where relevant, of vegetation clearance, habitat fragmentation, altered hydrology, water quality impacts, erosion and sedimentation impacting on creeks and wetlands, soil compaction, inappropriate/ineffective rehabilitation, groundwater contamination, impacts on surface and groundwater systems, waste material, risks associated with the transport or storage of hazardous chemicals, weed and pest invasion, and noise impacts. Species assessed must include, but are not limited to:
    - Common Sandpiper (*Actitis hypoleucos*);
    - Whimbrel (*Numenius phaeopus*);
    - Grey Plover (*Pluvialis squatarola*);
    - Marsh Sandpiper (*Tringa stagnatilis*); and
    - Terek Sandpiper (*Xenus cinereus*).
- A detailed assessment of any likely impact that the proposal may facilitate on listed migratory species at the local, regional, state, national and international scale;
- A statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- Analysis of the significance of the relevant impacts; and
- Any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

### 4.5.6 Assessment of Risks

Provide an assessment of risk to flora and fauna species likely to occur from the proposed action. In particular discuss:

- Potential impacts to native flora and fauna as a result of land clearing;

- The radiation risk to the environment as a result of the proposal;
- Any impacts to native flora and fauna due to noise and vibration;
- Potential impacts to native flora and fauna from exposure to dust and particulates resulting from the project; and
- Potential impacts to native flora and fauna from the introduction of weeds and feral animals.

### 4.5.7 Mitigation

Detail preventative, management and treatment strategies used to minimise the impacts of the project on native flora and fauna including, but not limited to, the risks identified above.

#### 4.5.7.1 Listed Threatened Species and Communities Safeguards and Mitigation

The EIS must provide information on proposed safeguards and mitigation measures to deal with the relevant potential impacts of the action on listed threatened species. Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices for each threatened species that may be impacted by the proposal and must include the following elements:

- A description of proposed safeguards and mitigation measures to deal with relevant potential impacts of the action, including mitigation measures that are currently or to be taken by State/Territory governments, local governments or the proponent;
- Assessment of the expected or predicted effectiveness of the mitigation measures; and
- Any statutory or policy basis for the mitigation measures.

Proposed mitigation measures must be incorporated in the Environmental Management Plan (EMP) (see Section 5).

#### 4.5.7.2 Listed Migratory Species Safeguards and Mitigation

The EIS must provide information on proposed safeguards and mitigation measures to deal with the relevant impacts of the action on listed migratory species. Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices for each migratory species that may be impacted by the proposal and must include the following elements:

- A description of proposed safeguards and mitigation measures to deal with relevant impacts of the action, including mitigation measures to be taken by State/Territory governments, local governments or the proponent;
- Assessment of the expected or predicted effectiveness of the mitigation measures; and
- Any statutory or policy basis for the mitigation measures.

Proposed mitigation measures must be incorporated in the EMP (see Section 5).

### 4.5.8 Monitoring

Detail reporting and monitoring programs of flora and fauna that will be used to evaluate and report on the effectiveness of the mitigation measures (Section 4.5.7).

## 4.6 Rehabilitation and Mine Closure

### 4.6.1 Key Risks

The proposal states that development, operation and closure of the Ranger 3 Deeps Underground Mine would not alter the current operating or closure and rehabilitation timeline for the Ranger Uranium Mine. Mining and ore processing at the Ranger Uranium Mine would be completed by January 2021 with site rehabilitation activities occurring within the period 2021 to 2026. The risk assessment should consider all potential environmental impacts associated with the closure and rehabilitation of the proposed activity in the context of the closure and rehabilitation of the Ranger Project Area.

### 4.6.2 Environmental Objective

The EIS should include a detailed assessment of any risks to demonstrate that:

- The Proponent is fully aware of any risks associated with closure and rehabilitation of the Ranger 3 Deeps Underground Mine and not meeting closure objectives;
- The prevention and mitigation of risks associated with closure and rehabilitation of the Ranger 3 Deeps Underground Mine and the potential impacts on the closure of the existing operation are adequately addressed; and
- The proposed project can be successfully integrated into the existing Ranger Uranium Mine rehabilitation requirements.

### 4.6.3 Information Requirements

- Provide the results of investigation into the physical, geo-mechanical and chemical properties of the ore body and host rock with respect to rehabilitation outcomes;
- Describe proposed post-mining land uses which have been identified and agreed upon through consultation with stakeholders; and
- Provide a plan of rehabilitation for the proposed project including:
    - the methods to be used for rehabilitation, revegetation and mine closure;
    - availability and volumes of key materials required for rehabilitation, revegetation and mine closure; and
    - details of proposed surface cover types for the rehabilitated surface, including information on the proposed thickness of the surface materials and their particle sizes, and the methodology that will be employed to ensure that these specifications are met.

### 4.6.4 Assessment of Risks

- Identify risks to the successful closure of the existing operation as a result of the proposal, including risks to prescribed closure timeframes;
- Provide an assessment of risk over the long term associated with the placement of tailings underground and the classification of radionuclides in the waste streams;
- Identify risks related to the long term alteration of surface and groundwater flows and hydrogeological systems as a result of the proposal;

- Identify risks related to closure timeframes and objectives and the proposal not realising its projected outcomes (i.e. delays);
- Identify and discuss risks associated with waste rock produced or not processed due to being replaced by ore from the Ranger 3 Deeps Underground Mine;
- Identify and discuss environmental risks associated with potentially acid forming materials and alkaline materials; and
- The post-closure risk assessment should include a discussion of the effects of:
    - changes in the assumptions used as a basis for the assessment; and
    - natural events, including earthquake, cyclone, fire and flood.

### 4.6.5 Mitigation

Provide a draft Mine Closure Plan (MCP) including the issues that require management at closure and demonstrate that all relevant issues and appropriate management measures have been identified. The MCP should highlight any changes to the existing Ranger MCP, should it be updated to include the Ranger 3 Deeps Underground Mine.

Demonstrate that the proposed project can be successfully integrated into the existing Ranger Uranium Mine rehabilitation requirements, including:

- That tailings placed in backfilled stopes will be physically isolated from the environment and that any contaminants arising from the tailings will not result in any short (whilst operational), medium (post closure and under institutional control) or long term (post-institutional control) detrimental environmental impacts;
- Revegetation of the areas disturbed by the project using local native plant species similar in density and abundance to those existing in adjacent areas of KNP, to form an ecosystem, the long term viability of which would not require a maintenance regime significantly different from that appropriate to adjacent areas of the park;
- Measures required to prevent contamination of groundwater, including cross contamination of aquifers, if required;
- Contingencies to make landforms secure and non-polluting in the event of unexpected or temporary closure;
- Protocol for measuring site rehabilitation success;
- Discussion of weed management; and
- Discussion of fire management.

### 4.6.6 Monitoring

- Describe the post-mining monitoring and reporting to be used to evaluate and report on the effectiveness and performance of the mitigation measures (Section 4.6.5); and
- Describe the contingency measures to be implemented in the event that monitoring demonstrates that management measures have not been effective.

## 4.7 Historic and Cultural Heritage

### 4.7.1 Key Risks

The risk assessment should consider any risks associated with the construction, operation and closure of the Ranger 3 Deeps Underground Mine that may result in the potential disturbance or damage to areas of historic and/or cultural heritage.

### 4.7.2 Objectives

The EIS should include a detailed assessment of the risks to demonstrate that:

- The Proponent is fully aware of the risks to historic and cultural heritage associated with all aspects of the proposal;
- The prevention and mitigation of risks to historic and cultural heritage are properly addressed in the design specifications;
- The risks can and will be managed effectively during the construction, commissioning, operation, decommissioning and post-closure phases of the development; and
- The values pertaining to cultural heritage for which KNP was inscribed on the World Heritage list are maintained.

### 4.7.3 Information Requirements

Baseline information should be provided regarding cultural heritage sites in the region, including:

- A description and location of Indigenous and non-Indigenous sites, places or objects of historic or contemporary cultural heritage significance, including:
    - Areas included within the world heritage listed Kakadu National Park that have cultural (Indigenous) World Heritage values;
    - Areas nominated for listing or listed on Commonwealth and Northern Territory Heritage registers and Commonwealth and Northern Territory registers of Indigenous cultural heritage;
    - Sacred sites- provision of evidence of an Aboriginal Areas Protection Authority (AAPA) Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act*;
    - Traditional and historic Aboriginal, Torres Strait Islander and Macassan archaeological objects protected under relevant Territory and/or Commonwealth legislation; and
    - European historic sites.
- A description of areas with particular values to Indigenous and non-Indigenous people (e.g. traditional land use).

### 4.7.4 Assessment of Risks

The identification of risks to Indigenous cultural heritage is to take place in consultation with relevant Indigenous groups. Provide:

- An assessment of the project's potential effects on sacred sites, heritage places, cultural sites and any potential impacts on Indigenous culture generally;

- Details of the Project's requirements to apply to, or applications already made to, the NT Minister for Lands, Planning and the Environment to disturb or destroy a prescribed archaeological place and/or object under the *Heritage Act*; and
- An assessment of risk to significant cultural sites from vibration and dust.

### 4.7.5 Mitigation

The Proponent should describe the prevention and mitigation of potential risks to existing areas of historic and cultural heritage. A management plan should be developed, if required, to address matters including:

- Procedures to avoid significant areas;
- Protection of key sites during construction, operation and decommissioning work; and
- Procedures for the discovery of surface or sub-surface items during the course of the project.

## 4.8 Socio-economic

### 4.8.1 Key Risks

The proposal has the potential to cause positive and/or negative impacts on the regional, Territory and national economies, and the social well-being of the population.

### 4.8.2 Objectives

The EIS should include a detailed assessment of the risks to demonstrate that for all stages of the proposal:

- The Proponent is fully aware of the economic and social impacts of all aspects of the project; and
- The prevention and mitigation of negative risks to economic and social impacts are adequately addressed.

### 4.8.3 Information Requirements

The EIS should include a balanced summary of the project's economic value (positive and negative) to the regional, Territory and national economies, in terms of direct and indirect effects on employment, income and production. The following are suggestions that may assist with highlighting the economic value of the project and are not intended to result in the inappropriate disclosure of confidential information. It should be noted in the EIS if data are not available or unsuitable.

Discuss the project's contribution to the NT and Australian economy, including:

- A summary of project feasibility;
- Estimated total project revenue for the duration of the project (to provide the economic scale of the project);
- Total contribution to Gross State Product (GSP) and Gross Domestic Product (GDP) over the economic life of the project;
- Opportunities available to regional centres based on the activity generated by the project (construction, rehabilitation and operation);
- Estimated overall tax;
- Estimated capital expenditure for the whole project;

- Expected annual operational expenditure;
- Estimated workforce and contractor numbers by occupational classification;
- Overall employment training proposed during commencement, construction and operations;
- Planned Indigenous employment, training and other project participation;
- Expected level of overseas recruitment;
- Availability of goods and services;
- Community and economic value of any residual infrastructure, such as roads, following the life of the project; and
- Other contributions to local communities, including traditional owners.

The EIS should include a balanced summary of the project's social value (positive and negative) on a regional, Territory, national and international scale. A brief description of the current population, demography and social aspects of the region affected by the proposal should be provided in the EIS. This should be done through community consultation, historic research and field survey. No information of a confidential nature, particularly related to anthropological matters relevant to Indigenous people or groups is to be disclosed in the EIS.

Existing social aspects, and their components, to be discussed must include:

- Key stakeholders;
- Regional community structures and vitality (e.g. demography, health, education and social well-being, access to services, housing);
- Social amenity; and
- The number and capacity of existing human services to support the construction work force:
    - skills audit of affected communities;
    - workforce characteristics; and
    - accommodation type and quantity.

### 4.8.4 Assessment of Risks

An Economic and Social Impact Assessment (ESIA) should be conducted. The ESIA should:

- Document the economic and social impacts of the proposed development on the region and more broadly, where relevant;
- Encourage development of new and/or expansion of existing businesses in the locality;
- Foster sustainable development and community wellbeing;
- Estimates of the quantity and value of production/exports relating to the proposed project, including expected reduction in revenue should the proposal not proceed;

- An estimate of the value to the local economy associated with expenditure during the construction phase and the annual expenditure on regional goods and services as it relates to the Ranger 3 Deeps Underground Mine and associated infrastructure;
- Benefits to the local community, during and beyond the life of the mine, such as development of new skills and facilities, economic development and opportunities for local and regional business and employment opportunities; and
- The risks of the Ranger 3 Deeps Underground Mine, related infrastructure and associated workforce negatively impacting on identified social issues in the region.

### 4.8.5 Mitigation and Monitoring

A Social Impact Management Plan (SIMP) should be prepared to address any identified risks associated with the ESIA. The SIMP should:

- Describe how the Proponent proposes to manage any identified economic, social, cultural or tourism risks from the proposal, or its associated workforce;
- Describe how potential local and regional business and employment opportunities related to the proposed project will be identified and managed;
- Include a mechanism for monitoring and reporting any identified potential socio-economic and cultural impacts;
- Include measures to mitigate negative economic and social impacts on the locality and region;
- Provide outcome and assessment criteria that will give early warning that management and mitigation measures are not achieving the outcomes and benefits expected and identified by the Proponent; and
- Provide a stakeholder communications strategy including identification of, and ongoing consultation and negotiations with, all relevant stakeholders, ensuring the full range of community viewpoints are sought and included in the EIS.

## 4.9 Additional Matters of National Environmental Significance

### 4.9.1 Key Risks

The proposed action has the potential to have a significant impact on the following additional matters of NES that are protected under Part 3 of the EPBC Act:

- World Heritage properties (sections 12 & 15A);
- National Heritage places (sections 15B & 15C);
- Wetlands of international importance (sections 16 & 17B);
- Protection of the environment from nuclear actions (sections 21 and 22A); and
- Commonwealth land (sections 26 & 27A).

The EIS must include a description of all of the environmental aspects of the proposal where there is potential for an impact on matters of NES. Potential impacts are impacts that the action will have or is likely to have on a matter protected by a controlling provision (as listed above).

### 4.9.2 Description of the Environment

The EIS must include a description of the:

- World and National Heritage values of the KNP World Heritage Property and National Heritage Place and a description of the areas of the KNP World Heritage Property and National Heritage Place that may be impacted by the proposal. The EIS must show consideration of the *Kakadu National Park Management Plan 2007 – 2014* and the world heritage values as set out in http://www.environment.gov.au/heritage/places/world/kakadu/values.html;
- Ecological character of the KNP Ramsar site and a description of the areas of the KNP Ramsar site that may be impacted by the proposal. The EIS must show consideration of the *Kakadu National Park Management Plan 2007 – 2014* and the *Kakadu National Park Ramsar site Ecological Character Description*; and
- Commonwealth land environment relevant to the proposal.

### 4.9.3 Relevant Impacts

The EIS must include a description of the relevant impacts during both the construction, operational and (if relevant) the decommissioning phases of the project. The following information must be provided for KNP World Heritage Property and National Heritage Place, Ramsar wetland, and Commonwealth land:

- A detailed assessment of potential impacts upon the values of the KNP World Heritage Property and National Heritage Place;
- A detailed assessment of potential impacts upon the ecological character of the KNP Ramsar Wetland;
- A detailed assessment of potential impacts upon Commonwealth land of KNP;
- Consideration, where relevant, of:
    - vegetation clearance;
    - altered hydrology and ground water flow;
    - water quality impacts;
    - erosion and sedimentation impacting on creeks and wetlands;
    - soil compaction;
    - inappropriate/ineffective rehabilitation;
    - contamination of the surrounding surface environment;
    - groundwater contamination;
    - impacts on surface and ground water systems;
    - risks associated with the transport or storage of hazardous chemicals;
    - weed and pest invasion; and
    - noise impacts.

### 4.9.4 Proposed Safeguards and Mitigation Measures

The EIS must provide information on proposed safeguards and mitigation measures to deal with the relevant impacts of the action on matters of NES that are protected under

Part 3 of the EPBC Act. Specific and detailed descriptions of proposed measures must be provided and substantiated and must include the following elements:

- A description of proposed safeguards and mitigation measures to deal with relevant impacts of the action, including mitigation measures to be taken by State/Territory governments, local governments or the proponent;
- Assessment of the expected or predicted effectiveness of the mitigation measures; and
- Any statutory or policy basis for the mitigation measures.

Proposed mitigation measures must be incorporated in the EMP (see Section 5).

# 5 Environmental Management

Specific safeguards and controls proposed to be employed to minimise or remedy environmental impacts identified in previous sections are to be included in an Environmental Management Plan (EMP), which would become part of the Mining Management Plan.

The EMP should be strategic, describing a framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing of the project. As much detail as is practicable should be provided to enable adequate assessment of the proposal during the public exhibition phase. Specific management practices and procedures should be included in the EMP, where possible.

The EMP should include:

- The proposed management structure of the operation and its relationship to the environmental management of the site;
- Management targets and objectives for relevant environmental factors;
- The proposed measures to minimise adverse impacts and maximise opportunities, including environmental protection outcomes;
- Performance indicators by which all anticipated and potential impacts can be measured;
- Proposed monitoring programs to allow early detection of adverse impacts;
- Proposed reporting protocols consistent with Commonwealth and Territory legislative requirements;
- Contingencies for events such as hydrocarbon and other hazardous chemical spills or natural disasters;
- The EMP needs to address the proposal phases (construction, operation, decommissioning) separately. It must state the environmental objectives, performance criteria, monitoring, reporting, corrective action, responsibility and timing for each environmental issue;
- The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;
- A summary table listing the commitments made in the EIS, including clear timelines for key commitments and performance indicators, with cross-references to the text of the EIS; and

- Provision for the periodic review of the EMP.

Reference should be made to relevant legislation, guidelines and standards, and proposed arrangements for necessary approvals and permits should be noted. Proposed reporting procedures on the implementation of the plan, independent auditing or self-auditing and reporting of accidents and incidents should be included. The agencies responsible for overseeing implementation of the EMP should be identified.

The EMP needs to include details of how the environmental management strategies outlined in the EMP will be incorporated into the existing operational management plans for Ranger Uranium Mine. Appropriate reference to aspects of the current operations that would be influenced or would form part of the Ranger 3 Deeps Underground Mine where relevant should be indicated.

The EMP would continue to be developed and refined following the conclusion of the assessment process, taking into consideration the proposed timing of development activities, comments on the EIS and incorporating the Assessment Report recommendations and conclusions.

# Attachment 1: The Objects and Principles of the *Environment Protection and Biodiversity Conservation Act 1999*

## 3 Objects of the Act

a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance;

b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;

c) to promote the conservation of biodiversity;

d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples;

e) to assist in the co-operative implementation of Australia's international environmental responsibilities;

f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and

g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

## 3A Principles of Ecologically Sustainable Development

The following principles are principles of ecologically sustainable development.

a) Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

b) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

c) The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

d) The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.

e) Improved valuation, pricing and incentive mechanisms should be promoted.

# Attachment 2: Matters that must be addressed in a Public Environment Report and Environmental Impact Statement (Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000)

## 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; and

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; and

   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; and

iii. if there has been consultation about the proposed action — any documented response to, or result of, the consultation; and

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; and

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; and

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; and

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; and

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 the PER/EIS 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.

# Attachment 3: Environmental Requirements of the Commonwealth of Australia for the Operation of the Ranger Uranium Mine

## Premable

The Environmental Requirements for the Ranger uranium mine set out the Commonwealth's environmental protection conditions with which the company must comply. These are conditions of the Authority issued under s41 of the *Atomic Energy Act 1953* and also reflect the Commonwealth's role in the Alligator Rivers Region under the *Environment Protection (Alligator Rivers Region) Act 1978*. The operational procedures and practices, and environmental standards, guidelines, codes, regulations or limits relevant to meeting these conditions are set out in Northern Territory legislation and the Ranger General Authorisation established under the *Uranium Mining (Environment Control) Act 1979 (NT)*.

Arrangements for consultation and approval concerning operations at Ranger are set out in the "Working Arrangements" contained in the Memorandum of Understanding between the Commonwealth and Northern Territory governments, as amended from time to time. These arrangements require the Supervising Authority to consult with and have regard to the views of the Supervising Scientist and the Northern Land Council (NLC) prior to:

a) granting an approval or authorisation, or issuing a licence or permit, in connection with environmental aspects of operations; or

b) granting approval of environmental management reports; or

c) setting standards in connection with any permit, licence, etc relating to environmental aspects of operations; or

d) agreeing to the outcome of Best Practicable Technology assessments.

The Supervising Authority will notify the Minister of any action or determination in respect of these Environmental Requirements and act on or implement any subsequent advice from the Minister.

## Primary Environmental Objectives

### 1 Environmental Protection

1.1 The company must ensure that operations at Ranger are undertaken in such a way as to be consistent with the following primary environmental objectives:

a) maintain the attributes for which Kakadu National Park was inscribed on the World Heritage list;

b) maintain the ecosystem health of the wetlands listed under the Ramsar Convention on Wetlands (i.e. the wetlands within Stages I and II of Kakadu National Park);

c) protect the health of Aboriginals and other members of the regional community; and

d) maintain the natural biological diversity of aquatic and terrestrial ecosystems of the Alligator Rivers Region, including ecological processes.

1.2 In particular, the company must ensure that operations at Ranger do not result in:

a) damage to the attributes for which Kakadu National Park was inscribed on the World Heritage list;

b) damage to the ecosystem health of the wetlands listed under the Ramsar Convention on Wetlands (i.e. the wetlands within Stages I and II of Kakadu National Park);

c) an adverse effect on the health of Aboriginals and other members of the regional community by ensuring that exposure to radiation and chemical pollutants is as low as reasonably achievable and conforms with relevant Australian law, and in particular, in relation to radiological exposure, complies with the most recently published and relevant Australian standards, codes of practice, and guidelines;

d) change to biodiversity, or impairment of ecosystem health, outside of the Ranger Project Area. Such change is to be different and detrimental from that expected from natural biophysical or biological processes operating in the Alligator Rivers Region; and

e) environmental impacts within the Ranger Project Area which are not as low as reasonably achievable, during mining excavation, mineral processing, and subsequently during and after rehabilitation.

### 2. Rehabilitation

2.1 Subject to subclauses 2.2 and 2.3, the company must rehabilitate the Ranger Project Area to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park.

2.2 The major objectives of rehabilitation are:

a) revegetation of the disturbed sites of the Ranger Project Area using local native plant species similar in density and abundance to those existing in adjacent areas of Kakadu National Park, to form an ecosystem the long term viability of which would not require a maintenance regime significantly different from that appropriate to adjacent areas of the park;

b) stable radiological conditions on areas impacted by mining so that, the health risk to members of the public, including traditional owners, is as low as reasonably achievable; members of the public do not receive a radiation dose which exceeds applicable limits recommended by the most recently published and relevant Australian standards, codes of practice, and guidelines; and there is a minimum of restrictions on the use of the area;

c) erosion characteristics which, as far as can reasonably be achieved, do not vary significantly from those of comparable landforms in surrounding undisturbed areas.

2.3 Where all the major stakeholders agree, a facility connected with Ranger may remain in the Ranger Project Area following the termination of the Authority, provided that adequate provision is made for eventual rehabilitation of the affected area consistent with principles for rehabilitation set out in subclauses 2.1, 2.2 and 3.1.

## Secondary Environmental Objectives

### 3. Water Quality

3.1 The company must not allow either surface or ground waters arising or discharged from the Ranger Project Area during its operation, or during or following rehabilitation, to compromise the achievement of the primary environmental objectives.

3.2 The company must, to the extent necessary to achieve the primary environmental objectives, take steps to minimise the volume of contaminated water that is required to be managed on site, minimise the load of contaminants within that water, and to concentrate and contain contaminants within the site.

3.3 Background values for key variables in water quality, including values for conductivity, pH and uranium, are determined by the Supervising Scientist from time to time and communicated to the company and other major stakeholders. Should the values for these variables measured at Gauging Station GS8210009, or other key locations, show trends away from, or be abruptly divergent from, those background values, and if, in the opinion of the Minister, with the advice of the Supervising Scientist, the results may be attributable to mining operations, then the company must undertake such investigations and remedial actions as required by the Supervising Authority after consultation with the Supervising Scientist and other major stakeholders.

3.4 Process water must be totally contained within a closed system except for:

a) losses through natural or enhanced evaporation;

b) seepage of a quality and quantity that will not cause detrimental environmental impact outside the Ranger Project Area; and

c) subject to clauses 3.1, 3.2 and 3.3, process water which has been treated to achieve a quality which:

i. conforms to a standard practice or procedure recommended by the Supervising Scientist; and

ii. is not less than that of the water to which it is to be discharged.

### 4. Air Quality

4.1 Emissions of gaseous and particulate contaminants must conform with Australian law, and, taking into account the most recently published and relevant Australian standards, codes of practice, and guidelines, be managed to minimise the effects of particulate and gaseous contaminants from the point of view of all possible radiological, physical and chemical hazards.

4.2 Air quality must be managed in such a way that there is no physical or chemical detriment to any known sites of Aboriginal culture or heritage.

### 5. Radiological Protection

5.1 The company must implement a system to control the radiological exposure of people and the environment arising from its mining and milling activities. The system and the dose limits applied must comply, at the minimum, with relevant Australian law taking into account the most recently published and relevant Australian standards, codes of practice, and guidelines. Subject to clause 5.3, the company must achieve the following outcomes:

a) Radiation doses to company employees and contractors must be kept as low as reasonably achievable and must always remain less than the dose limit for workers;

b) Radiation doses to people who are not company employees or contractors must be kept as low as reasonably achievable and must always remain less than the dose limit for members of the public; and

c) Ecosystems surrounding the Ranger Project Area must not suffer any significant deleterious radiological impacts.

5.2 The company must comply with any dose constraints established or amended by the Supervising Authority or the Minister with the advice of the Supervising Scientist to take account of other anthropogenic radiation sources such that subject to clause 5.3, the total radiation dose received by members of the public does not exceed the applicable dose limit.

5.3 Radiation doses received from natural background sources or as the result of undergoing medical procedures are not subject to the system and are not to be included in the calculation of radiation doses.

### 6. Storage, Use and Disposal of Hazardous Substances and Wastes

6.1 All hazardous substances (including chemicals, reagents, fuels and oils) must be stored, used and disposed of in conformance with relevant Australian law and in accordance with any standards, practices or procedures advised by the Supervising Authority or the Minister with the advice of the Supervising Scientist to minimise the risk to human health and ecosystem health.

6.2 The company must ensure that wastes will not result in any detrimental environmental impact outside of the Ranger Project Area, and that environmental impacts within the Ranger Project Area are as low as reasonably achievable.

6.3 From the date of the Authority the company must prepare and maintain records of the location, state and chemical characteristics of all hazardous substances and wastes contained, used and disposed of on the Ranger Project Area. The company must take all reasonable steps to include in the record details of hazardous substances contained, used or disposed of on the Ranger Project Area before the date of the Authority.

### 7. Management of Excavated Material

7.1 All excavated material must be managed such that there is no detrimental environmental impact outside of the Ranger Project Area, and that environmental impacts within the Ranger Project Area are as low as reasonably achievable.

### 8. Blasting

8.1 The company must ensure that detonation of explosives cannot damage the environment outside of the Ranger Project Area, or any sites significant to Aboriginal culture and heritage.

### 9. Rehabilitation Plan

9.1 The company must prepare a rehabilitation plan which is approved by the Supervising Authority and the Minister with the advice of the Supervising Scientist, the implementation of which will achieve the major objectives of rehabilitation as set out in subclause 2.2, and provide for progressive rehabilitation.

9.2 All progressive rehabilitation must be approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist and subject to the NLC agreeing that the aim and objectives for rehabilitation as described in clause 2 are met.

9.3 The company's obligations under clause 9 will cease in respect of any part of the Ranger Project Area over which a close-out certificate is issued by the Supervising Authority subject to the Supervising Scientist and the NLC agreeing that the specific part of the Ranger Project Area has met the requirements of clause 2.

9.4 Where agreements under subclause 9.2 or 9.3 cannot be reached the Minister will make a determination with the advice of the Supervising Scientist.

### 10. Protection of Soil, Vegetation and Fauna

10.1 All operations should be managed to minimise, to the maximum extent practicable, and to the satisfaction of the Supervising Authority or the Minister with the advice of the Supervising Scientist:

a) the disturbance of soil, vegetation and fauna within the Ranger Project Area; and

b) the risk to fauna as a result of drinking contaminated water.

10.2 The company must ensure that the operations at Ranger will not result in any adverse impact on Kakadu National Park through the introduction of exotic fauna or flora.

### 11. Management of Tailings

11.1 During mining operations and prior to final placement, covering and rehabilitation of the tailings, tailings must be securely contained in a manner approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist which prevents detrimental environmental impact.

11.2 By the end of operations all tailings must be placed in the mined out pits.

11.3 Final disposal of tailings must be undertaken, to the satisfaction of the Minister with the advice of the Supervising Scientist on the basis of best available modelling, in such a way as to ensure that:

i. the tailings are physically isolated from the environment for at least 10,000 years;

ii. any contaminants arising from the tailings will not result in any detrimental environmental impacts for at least 10,000 years; and

iii. radiation doses to members of the public will comply with relevant Australian law and be less than limits recommended by the most recently published and relevant Australian standards, codes of practice, and guidelines effective at the time of the final tailings disposal.

## Other Provisions

### 12. Best Practicable Technology

12.1 All aspects of the Ranger Environmental Requirements must be implemented in accordance with BPT.

12.2 Where there is unanimous agreement between the major stakeholders that the primary environmental objectives can be best achieved by the adoption of a proposed action which is contrary to the Environmental Requirements, and which has been determined in accordance with BPT, that proposed action should be adopted. Where agreement can not be reached the Minister will make a determination with the advice of the Supervising Scientist.

12.3 All environmental matters not covered by these Environmental Requirements must be dealt with by the application of BPT.

12.4 BPT is defined as:

That technology from time to time relevant to the Ranger Project which produces the maximum environmental benefit that can be reasonably achieved having regard to all relevant matters including:

a) the environmental standards achieved by uranium operations elsewhere in the world with respect to

i. level of effluent control achieved; and

ii. the extent to which environmental degradation is prevented;

b) the level of environmental protection to be achieved by the application or adoption of the technology and the resources required to apply or adopt the technology so as to achieve the maximum environmental benefit from the available resources;

c) evidence of detriment, or lack of detriment, to the environment;

d) the physical location of the Ranger Project;

e) the age of equipment and facilities in use on the Ranger Project and their relative effectiveness in reducing environmental pollution and degradation; and

f) social factors including the views of the regional community and possible adverse effects of introducing alternative technology.

12.5 Proposals to amend or introduce operational approaches, procedures or mechanisms must be supported by a BPT analysis. The rigour of the BPT analysis must be commensurate with the potential environmental significance of the proposal. The BPT analysis must involve consultation with and having regard to the views of the major stakeholders and copies of the BPT analysis must be provided to each of the major stakeholders.

12.6 A precautionary approach is to be exercised in the application of BPT in order to achieve outcomes consistent with the primary environmental objectives.

## 13. Environmental Monitoring

13.1 During operations the company must carry out a comprehensive monitoring program, as required by the Supervising Authority or the Minister with the advice of the Supervising Scientist, which:

a) includes monitoring stations on Magela Creek upstream and downstream of the mine at Gauging Stations GS8210028 and GS8210009 and such other sites as may be approved or required by the Supervising Authority or the Minister with the advice of the Supervising Scientist; and

b) is sufficient to allow interpretive analysis of impacts from operations.

13.2 The company must ensure proper analysis of monitoring results to the satisfaction of the Supervising Authority or the Minister with the advice of the Supervising Scientist and:

a) must make data and reports available to the major stakeholders; and

b) must make reports of monitoring results and analysis, other than commercial-in-confidence matters, available to members of the Advisory Committee established under the *Environment Protection (Alligator Rivers Region) Act 1978*.

13.3 The company must carry out a monitoring program approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist following cessation of operations until such time as a relevant close-out certificate is issued under clause 9.3.

## 14. Staffing

14.1 The company must employ adequate numbers of competent, appropriately qualified and experienced staff to ensure that it can provide the required level of protection to the environment, human health, and Aboriginal culture and heritage.

### 15. Research

15.1 The company must undertake research with a view to maximising the level of environmental protection at Ranger. Plans and results of environmental research by the company will be provided to the Technical Committee established under the *Environment Protection (Alligator Rivers Region) Act 1978* to enable the committee to effectively co-ordinate environmental research in the region.

### 16. Reporting Incidents

16.1 The company must directly and immediately notify the Supervising Authority, the Supervising Scientist, the Minister and the Northern Land Council of all breaches of any of these Environmental Requirements and any mine-related event which:

a) results in significant risk to ecosystem health; or

b) which has the potential to cause harm to people living or working in the area; or

c) which is of or could cause concern to Aboriginals or the broader public.

### 17. Environmental Standards

17.1 Nothing in these Environmental Requirements must be interpreted to prevent or discourage the company from attaining higher environmental standards than those specified.

### 18. Environmental Management Report

18.1 The company must prepare an Environmental Management Report which is approved by the Supervising Authority and the Minister with the advice of the Supervising Scientist. Approval may be given conditionally. The company must submit the Environmental Management Report to the NLC at the same time as submitting it for approval. The Environmental Management Report must be prepared in accordance with guidelines as determined by the major stakeholders. The report must provide details of:

a) the company's environmental management over the preceding 12 month period; and

b) the company's proposals for complying with the Environmental Requirements and all applicable environmental laws over the following 12 months.

18.2 The report required under clause 18.1 must deal specifically with the following matters:

a) water management;

b) land management;

c) protection of cultural sites;

d) counter disaster and emergency procedures;

e) environmental research;

f) environmental monitoring, including any environmental monitoring required by the Supervising Authority;

g) social impact monitoring;

h) hazardous substances and industrial waste management;

i) radiation monitoring and management;

j) air quality management;

k) tailings management;

l) excavated material management;

m) environmental planning and operating systems, including employment and training programs; and

n) rehabilitation.

18.3 The company must ensure that the Environmental Management Report is updated and submitted at such times as are required by the Supervising Authority or the Minister with the advice of the Supervising Scientist, and no less often than annually.

18.4 The company must comply with the proposals set out in each Environmental Management Report as approved and subject to any conditions set by the Supervising Authority or the Minister with the advice of the Supervising Scientist.

## 19. Interpretation of the Environmental Requirements

19.1 In interpreting this document, a construction that would promote the primary environmental objectives must be preferred to a construction that would not promote those objectives.

19.2 In the interpretation of a provision in this document, consideration should be given to any relevant explanatory material agreed to by the major stakeholders and published by the Supervising Scientist.

*[Note: explanatory material may include material that is in a report of the Supervising Scientist published under section 36 of the Environment Protection (Alligator Rivers Region) Act 1978].*

19.3 In this document, unless the contrary intention appears, a word or phrase has the same meaning as in the Authority.

19.4 The Preamble and headings are not part of these Environmental Requirements and shall not be used in the interpretation or construction of these Environmental Requirements.

## 20. Definitions of Terms

**Alligator Rivers Region** or **Region** has the same meaning as in the *Environment Protection (Alligator Rivers Region) Act 1978*.

**Authority** means the Authority to carry on operations granted under section 41 of the *Atomic Energy Act 1953*.

**Background values** are the background values for water quality determined by the Supervising Scientist on the basis of:

a) the extensive historical data sets that are available in the region;

b) using data that will ensure that the background values reflect the water quality that would exist in the absence of mining;

c) an assessment of the natural distribution of chemical constituents in the stream.

**Biological diversity** means the variety within and among living organisms and of the ecological systems they comprise.

**BPT** means best practicable technology as defined in subclause 12.4.

**Close-out** means the point at which the Supervising Authority determines that the requirements of clause 2 have been met or are assured, appropriate regulations and standards have been met, and the site is suitable for the intended future land use.

**Company** means the company or organisation which is the grantee of the Authority or its permitted successors or assignees.

**Detrimental environmental impact** means any impact arising from the mining operation, whether direct or indirect, which causes or is likely to cause a change to biodiversity, or impairment of ecosystem health. Such change is to be different and detrimental from that expected from biophysical or biological processes operating in the Alligator Rivers Region.

**Dose constraint** means a radiation dose target, which is less than the radiation dose limit for workers or the radiation dose limit for members of the public, as applicable, below which radiation doses should be able to be maintained in a well managed operation.

**Ecosystem** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

**Ecosystem health** means the ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of the natural habitat of the region.

**Environment** includes:

a) ecosystems and their constituent parts, including people and communities; and

b) natural and physical resources; and

c) the qualities and characteristics of locations, places and areas; and

d) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b) or (c).

**Environmental Management Report** means Environmental Management Reports prepared by the company pursuant to clause 18.

**Excavated material** means all rock and soil removed from its original site as part of the operations.

**Minister** means the Minister for the time being administering section 41 of the *Atomic Energy Act 1953*.

**Major stakeholders** means the primary groups directly responsible for or representing people affected by Ranger. They are the company, the Northern Territory government, the Commonwealth government, and the Northern Land Council.

**Precautionary approach** is an approach where decisions are guided by careful evaluation to avoid serious or irreversible damage to the environment.

**Primary environmental objectives** means the objectives set out in clauses 1 and 2.

**Process water** means water that has been used in the milling and processing of ore materials, or the transport of waste to any tailings repository, including any water held within a tailings repository.

**Ranger** means the mine or the operations undertaken on the Ranger Project Area.

**Ranger General Authorisation** means the authorisation issued by the NT Minister for Mines and Energy under the *Uranium Mining (Environment Control) Act 1979*.

**Regional community** means people living or working in the Alligator Rivers Region.

**Rehabilitation** includes decommissioning to remove plant and equipment, foundations and related infrastructure; civil works to reshape and stabilise the mine site, primarily to minimise erosion, contain contamination, and for aesthetic reasons; the final placement of tailings and all other excavated material and any hazardous substances; and revegetation.

**Supervising Authority** means the person having responsibility under an applicable law or if there is no applicable law the person performing the duties of Supervising Scientist under the Environment Protection *(Alligator Rivers Region) Act 1978*.

**Tailings** means the ground-up rock and process chemical residues after processing and extraction of the economic mineral from the ore