

# Chapter 1

## Introduction and context

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# 1 INTRODUCTION AND CONTEXT

## 1.1 THE PROJECT

### 1.1.1 Background

Energy Resources of Australia Ltd (ERA) owns and operates the Ranger uranium mine (Ranger mine). The Ranger mine is situated on the Ranger Project Area (RPA), which is on Aboriginal land about 260 km east of Darwin and approximately 11 km east of the regional centre of Jabiru. The RPA is surrounded by, but separate from, Kakadu National Park (**Figure 1-1**).

ERA has been the continuous operator of the Ranger mine since 1980, mining uranium ore from two deposits and producing over 110,000 tonnes of uranium oxide. ERA sells its product to power utilities in Asia, Europe and North America under strict international and Australian Government safeguards.<sup>1</sup> The company aims to maintain long term relationships with its customers to meet their energy needs and provide a reliable supply of high quality product.

In November 2008, ERA announced the significant mineral exploration target defined as Ranger 3 Deeps. On 15 April 2009, ERA lodged notifications with the Australian and Northern Territory (NT) governments for the Ranger 3 Deeps exploration decline project.<sup>2</sup> The primary purpose of the exploration decline is to enable underground exploration and in-fill drilling of the resource to increase orebody knowledge. In addition to orebody knowledge, the decline will provide geological, geotechnical and radiological data and direct information on hydrogeological conditions prior to commencement of an underground mine. The Australian government subsequently determined that the exploration decline project was not a controlled action that required further environmental assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In addition, the NT Government determined that the exploration decline project did not require formal environmental assessment under the NT *Environmental Assessment Act*. Consequently the exploration decline project and associated infrastructure is not subject to assessment, but rather constitutes existing activities.

ERA lodged a referral and notice of intent with the Australian and NT governments respectively for the Ranger 3 Deeps Underground Mine (the Project) on 16 January 2013. This was undertaken in parallel with construction of the Ranger 3 Deeps exploration decline project so that ERA can make an informed decision about underground mining when statutory environmental approvals are in place. It was determined that the Project required

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<sup>1</sup> The Nuclear Non-Proliferation Treaty, the Convention on the Physical Protection of Nuclear Material and Australia's other various bilateral safeguards agreements.

<sup>2</sup> Refer EPBC Referral 2009/4860: [http://www.environment.gov.au/cgi-bin/epbc/epbc\\_ap.pl?name=current\\_referrals&limit=999999&text\\_search=exploration+decline](http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=exploration+decline)

formal environmental assessment at the Environmental Impact Statement (EIS) level (refer EPBC Act reference 2013/6722<sup>3</sup>).

The Ranger 3 Deeps resource is estimated to contain more than 32,000 tonnes of uranium oxide.<sup>4</sup> However, the accuracy of the resource estimate continues to be evaluated through the resource definition drilling program occurring under the Ranger 3 Deeps exploration decline project. The mineral resource and mine workings associated with the Project will be at depths of greater than 300 m. Mineralised material will be transported to the surface and processed through the existing processing plant.

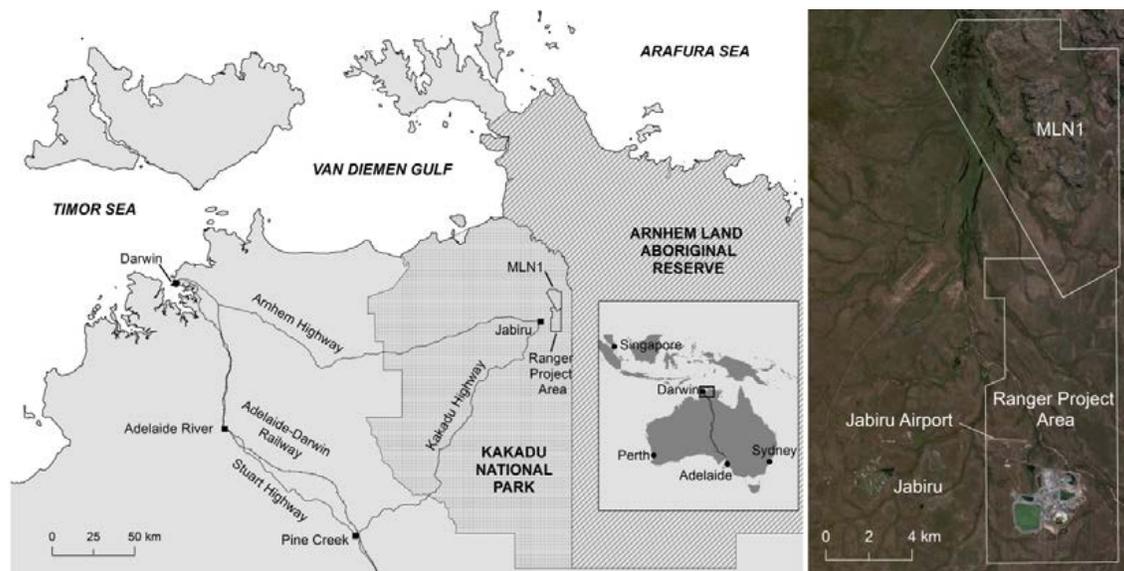


Figure 1-1: Location of the RPA and Ranger mine

## 1.1.2 Project Objectives

The key objectives of the Project are to:

- Sustainably support the continuation of mining at Ranger until cessation of the current operating approval (8 January 2021).
- Maintain ERA's financial contribution to the regional, NT and national economies.
- Maximise the value of the deposit for the benefit of ERA shareholders, the nation and the community.
- Design, construct and operate a development that achieves positive economic and social outcomes without significant impact to the surrounding environment.

<sup>3</sup> Refer EPBC Referral 2013/6722: [http://www.environment.gov.au/cgi-bin/epbc/epbc\\_ap.pl?name=current\\_referral\\_detail&proposal\\_id=6722](http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6722); or NT EPA: <http://www.ntepa.nt.gov.au/environmental-assessments/assessment/register/ranger-3-deeps-underground-mine>

<sup>4</sup> Refer ERA release to the ASX, 20 June 2014: <http://www.asx.com.au/asxpdf/20140620/pdf/42qb2nbqhnynw1.pdf>.

### 1.1.3 Brief Project Description

The Project is to develop the Ranger 3 Deeps mineral resource, which has been defined by a series of successive surface drilling programs from 2005 – 2009 and, more recently, through resource definition drilling undertaken via the exploration decline.

The Project adjoins the existing Ranger mine and thus will utilise substantial existing plant and associated infrastructure. For example, underground mining will involve a series of stopes<sup>5</sup> located more than 300 m below ground level, accessed via the existing Ranger 3 Deeps exploration decline. Ore will be transported to the surface in trucks and processed through the existing processing plant, together with stockpiled low-grade ore mined previously. Due to the selective nature of the underground mining method, only a relatively small quantity of waste rock will be generated (approximately 0.5 million tonnes in total). A portion of the Project's waste rock will be blended with concrete and used to backfill portions of the mine to provide additional ground support for safe mining operations. The remaining waste rock will be placed on existing stockpiles for future rehabilitation of the mine site. The ventilation system<sup>6</sup> constructed for the Ranger 3 Deeps exploration decline will be utilised for the Project and augmented to include additional ventilation shafts and a refrigeration system.

New surface infrastructure will include the following key elements.

- A backfill plant and reticulation system, constructed within the footprint of the current Ranger mine operational area. The plant will generate a cement-like material comprising tailings and rock aggregate which will be pumped underground into the mined-out stopes, thereby providing additional ground support to the underground workings.
- Additional ventilation shafts and refrigeration system to provide cool fresh air to the underground mine work areas and remove exhaust air.
- Incremental power generation to provide electrical power for the surface infrastructure and underground mine.
- A mine dewatering system to remove water from the underground mine.
- Other ancillary infrastructure including:
  - Diesel storage; compressed air system; air, water, and electrical reticulation; shotcrete transfer station; underground water supply system; office, showers and ablutions facilities; roads, fences, gates and controlled areas.

A detailed description of the Project and associated infrastructure is provided in **Chapter 3**.

The infrastructure footprint covers approximately 11 ha of land almost entirely within the current operating area. Apart from 0.3 ha of vegetation clearing for ventilation infrastructure and 0.4 ha of previously approved clearing for the exploration decline ventilation (Exhaust 3a), no new clearing is planned. However, during construction of the decline it is possible

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<sup>5</sup> The underground openings or "rooms" made in the process of extracting ore.

<sup>6</sup> The existing fixed ventilation comprises a ducted ventilation system in combination with one exhaust ventilation shaft, located within the Magela land application area, which is an area of the RPA that was used for the disposal of treated mine water through evapotranspiration.

that unexpected ground conditions or other engineering difficulties may require some ventilation shafts to be relocated.

**Figure 1-2** shows the indicative location and extent of new Project infrastructure in relation to the underground mineralisation and relative to existing Ranger mine infrastructure. The final placement of infrastructure within this area may vary, depending on specific site geotechnical conditions and will be determined during the feasibility study.

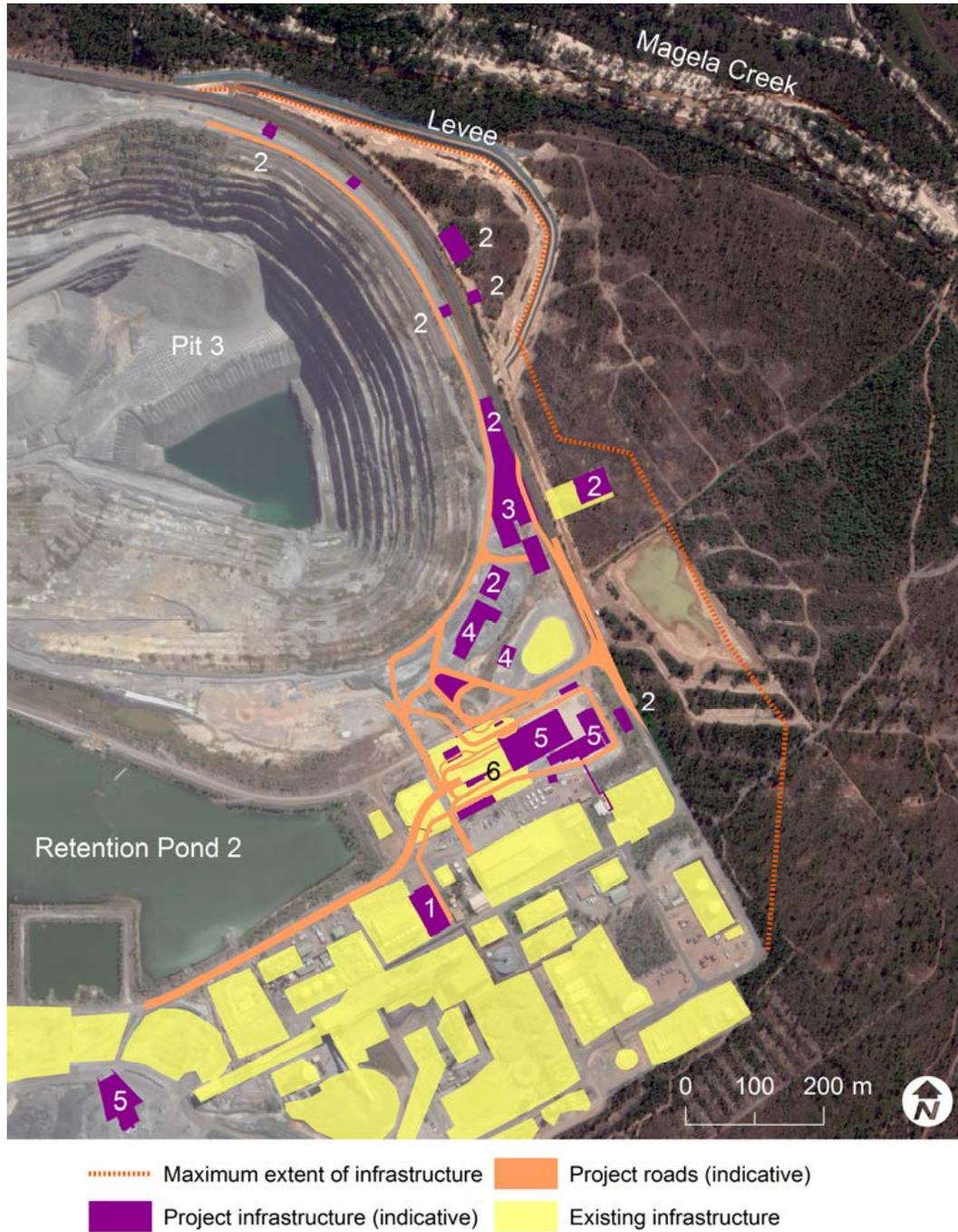


Figure 1-2: Indicative location and layout of new Project infrastructure

## 1.2 PROJECT PROPONENT

The Project proponent for the Ranger 3 Deeps underground mine is Energy Resources of Australia Ltd (ACN 008 550 865) (ERA). ERA wholly owns:

- Ranger mine, located on the RPA; and
- Mining lease "MLN1", located immediately to the north of the RPA.

ERA is Australia's longest continually operating uranium producer. Ranger mine has operated for more than three decades without significant environmental impact on the surrounding area or Kakadu National Park. Ranger mine is one of only three mines in the world to have produced in excess of 110,000 tonnes of uranium oxide. ERA is listed on the Australia Securities Exchange and is 68% owned by Rio Tinto Limited.

During 2005 – 2009 the company's surface drilling program led to the discovery of the Ranger 3 Deeps mineral resource. Following on from the determination in 2009 that the exploration decline did not require formal government environmental assessment, approval for the project was progressed through the Ranger Minesite Technical Committee (MTC)<sup>7</sup> and construction of the Ranger 3 Deeps exploration decline subsequently began in May 2012. Underground, close-spaced drilling began in May 2013, with initial drilling results in line with the current geological model and structural interpretation.

Following the completion of open pit mining operations in Pit 3 in November 2012, ERA submitted a referral for the Ranger 3 Deeps underground mine. Transition to underground mining is subject to receiving all necessary approvals following submission of the Draft EIS.

Further information about ERA can be accessed online at: [www.energyres.com.au](http://www.energyres.com.au).

Contact details:

Energy Resources of Australia Ltd  
PO Box 2394  
DARWIN NT 0801  
**Website:** [www.energyres.com.au](http://www.energyres.com.au)

## 1.3 SUMMARY OF EXISTING OPERATIONS AT RANGER MINE

### 1.3.1 Setting

The RPA is surrounded by, but separate from, Kakadu National Park. The town of Jabiru was originally established in 1982, to service Ranger mine. Jabiru is the main service town for Kakadu National Park, providing a range of small regional town facilities for national and international visitors, and the town's residents. Jabiru is accessible via the Arnhem Highway from Darwin and via the Kakadu Highway from Pine Creek, as well as by air charter.

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<sup>7</sup> A full description of the MTC is provided in **Section 1.3.6.3**.

Ranger mine lies approximately 11 km east of Jabiru. The mine site is bounded on the east and north by Magela Creek and its tributaries and, on the west, by Gulungul Creek and its tributaries. The region is known for its high conservation and cultural values. Two broad terrestrial habitat types (lowland riparian rainforest and woodland habitats) exist on the RPA, together with various ephemeral aquatic habitats. Approximately 70% of the RPA remains undisturbed by current operations.

### **1.3.2 History of Assessment and Development of Ranger Mine**

The Peko-Wallsend Operations Limited (Peko) and Electrolytic Zinc Company of Australasia Ltd (EZ) exploration joint venture discovered the Ranger deposits by aerial radiometric survey in October 1969. Further drilling confirmed the feasibility of mining Ranger #1 and Ranger #3 orebodies and, in June 1971, the two companies established Ranger Uranium Mines Pty Ltd to manage and develop the deposits.

In December 1972 a new Federal Government was elected and the granting of a mining lease was deferred while the government defined and implemented a policy of public ownership of certain energy resources, including uranium. To comply with the government's energy resources policy, the joint venturers signed the "Lodge Agreement" in October 1975, whereby the Australian Atomic Energy Commission, as agent for the Government, retained ownership of the uranium and financed the project to 72.5%. The joint venturers were to fund the balance in equal shares. The Australian Atomic Energy Commission would sell the uranium for the government with 50% of the net proceeds from the sale to be received by the joint venturers.

The Australian Government's decision to allow the mining and milling of uranium at Ranger mine was made following the recommendations of the First and Second Reports of the Ranger Uranium Environmental Inquiry (the 'Fox inquiry'). The Fox inquiry was established under the provisions of the now repealed Australian Government's Environmental Protection (Impact of Proposal) Act 1974. In February 1974, an Environmental Impact Statement was submitted under this Act. Supplements to the Environmental Impact Statement were submitted in May 1975 and, in August 1977, a new Federal Government announced approval of the project.

During the period, much of the Alligator Rivers Region was declared a National Park, with Aboriginal people given a major role in park management. The Federal Government introduced laws covering the Alligator Rivers Region (*Environment Protection (Alligator Rivers Region) Act 1978*) and established the functions and responsibilities of the Supervising Scientist and the Environmental Research Institute of the Supervising Scientist (ERISS), as well as the Alligator Rivers Region Advisory Committee and the Alligator Rivers Region Technical Committee, to overview the environmental regulation of mining in the region.

In 1978, title to the RPA was granted to Kakadu Aboriginal Land Trust, under the *Aboriginal Land Rights (Northern Territory) Act 1976* (Aboriginal Land Rights Act). In November 1978, the Australian Government entered an agreement with the Northern Land Council to permit mining to proceed. Construction began in January 1979 and, in August 1979 the government announced its intention to divest its interest in the project. A proposal by Peko-Wallsend to establish a new company, Energy Resources of Australia Ltd, to purchase the existing partners' interests was accepted by the government and ERA was formally incorporated in

the Act on 8 February 1980. On 1 October 1981, with commissioning completed, Ranger mine came into full production.

Mining of Ranger #1 orebody (Pit 1) was completed in December 1994 and development of the adjacent Ranger #3 orebody (Pit 3) commenced in 1996. **Annexe A** provides an historical timeline for Ranger mine.

Ranger mine operates under a unique Authority issued under the Commonwealth *Atomic Energy Act 1953*, rather than a Northern Territory mining lease. However, the mine is also subject to an Authorisation under the Northern Territory *Mining Management Act 2001*.

### 1.3.3 Existing Operations

Until recently, operations at Ranger mine involved conventional open-cut mining of uranium ore.<sup>8</sup> Uranium is currently recovered from stockpiled ore by sulfuric acid leaching in a processing plant. The uranium is then purified, concentrated, precipitated, calcined (dried), drummed and exported. Components of the existing mining and processing operations are:

- The processing area comprising power station (which also provides power to the township of Jabiru), processing plant, administration and maintenance facilities.
- A tailings dam (of approximately 110 ha) that was used for tailings storage until 1996, and then as a water storage and evaporation basin until late 2008 when it was returned to a combined tailings and process water storage.
- The two mined out pits – Pit 1 and Pit 3.
- Ore and waste rock stockpiles.
- A number of retention ponds and constructed wetland filters to manage seepage and runoff from stockpiles during the wet season, and storage of mine-generated process and pond waters during the dry season.
- Water treatment plants to treat pond water.
- Brine concentrator to treat process water.
- Irrigation areas to dispose treated pond water and managed release waters.
- Access road and service tracks.
- Ranger 3 Deeps exploration decline.
- Contractor accommodation facilities.
- Jabiru airport and associated infrastructure, including Australian Government buildings (on land licensed from ERA), tourist facilities, a workshop owned by the Gagudju Association (on land licensed from ERA).

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<sup>8</sup> Mining ceased in Pit 3 in November 2012.

Although open-cut mining has ceased, ERA will continue to progressively process lower grade ore from stockpiles up to the cessation date for operations as specified under the section 41 Authority (January 2021), whilst it remains economic to do so.

For a detailed description of existing operations at Ranger mine, refer to **Chapter 2**.

### **1.3.4 Relevant Legislation, Strategies and Policies**

#### **1.3.4.1 Legislation and Regulations**

Operations at Ranger mine are governed by both Australian and NT legislation and regulations. The key instrument that governs operations at the Ranger mine on a day to day basis is the Ranger Authorisation issued under the NT Mining Management Act. The Ranger Authorisation incorporates the Environmental Requirements which attach to the section 41 Authority (issued by the Commonwealth Government under the Atomic Energy Act for the Ranger mine). The terms of operation governing the Ranger mine are set out in the Ranger Authorisation in accordance with the Mining Management Act.

All changes to the Ranger Authorisation require approval by the NT Minister for Mines and Energy on advice from the MTC. This committee comprises representatives of the Northern Territory Department of Mines and Energy (Chair), Office of the Supervising Scientist (OSS), ERA, Gundjehmi Aboriginal Corporation (GAC) and the Northern Land Council (NLC).

Much of the specific regulation relating to ERA's operations at Ranger mine focuses on environmental, social, community and cultural heritage issues. There are three major reasons for this level of regulation:

- The product: uranium is a "prescribed substance" owned by the Australian Government and extracted from the RPA in accordance with the Commonwealth *Atomic Energy Act 1953*.
- Land ownership: ERA's operations are on Aboriginal land.
- The location: surrounded by, but separate from, the world heritage listed Kakadu National Park.
- Key legislation and regulations directly relevant to operations at Ranger mine and the export of uranium oxide product are set out below.. A full description of these regulations is provided in **Annexe B**.

#### ***Regulation relevant to mining and transport***

- *Atomic Energy Act 1953* (Commonwealth).
- *Customs Act 1901* (Commonwealth); Customs (Prohibited Exports) Regulations 1958.
- *Australian Radiation Protection and Nuclear Safety Act 1998* (Commonwealth).
- *Nuclear Non-Proliferation (Safeguards) Act 1987* (Commonwealth).
- *Nuclear Safeguards (Producers of Uranium Ore Concentrates) Charge Act 1993* (Commonwealth).
- *Radioactive Ores and Concentrates (Packaging and Transport) Act* (NT).
- Code of Practice for Safe Transport of Radioactive Material (2008).
- *Radiation Protection Act* (NT).

- Mining Management Act (NT).
- Code of Practice and Safety Guide on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005).

***Regulation relating to Aboriginal land ownership***

- *Aboriginal Land Rights (Northern Territory) Act 1976* (Commonwealth).
- *Aboriginal Land Act* (NT).
- *Aboriginal Sacred Sites Act* (NT).
- *Heritage Act 2011* (NT); Heritage Regulations 1991.
- *Protection of Movable Cultural Heritage Act 1986* (Commonwealth).
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Commonwealth).

***Regulation relevant to Ranger's location***

- *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act); Environment Protection and Biodiversity Conservation Regulations 2000.
- *Environment Protection (Alligator Rivers Region) Act 1978* (Commonwealth).
- *Environmental Protection (Northern Territory Supreme Court) Act 1978* (Commonwealth).
- *Environmental Assessment Act* (NT); Environmental Assessment Regulations.
- *Jabiru Town Development Act* (NT).

**1.3.4.2 Other Government Approvals**

A range of approvals already exist for the Project. **Table 1-1** summarises the statutes and regulations for which approval or licences may be required, or for which existing instruments will need revising, e.g. the Ranger Authorisation.

Table 1-1: Statutes and regulations for which approval or licences may be required

Legislation	Type of permit/approval required	Comments
Atomic Energy Act 1953 (Cth)	Environmental	Environmental Requirements issued under section 41 of the Act may need revision to include conditions for underground mining.
Building Act 1993 (NT) Building Regulations (NT)	Construction and building approvals	This Act and Regulations ensure that buildings are designed to comply with the health, safety and structural provisions of relevant legislation, building codes and standards.  Section 65 of the Act deals with the issue of an occupancy permit which may be required to be obtained by ERA.
Electricity Report Act 2000 (NT)	Electrical – permits, licenses and agreement modifications	Schedule 2(a) of the licence may require amendment to incorporate the additional power generation.  Other permitting requirements covered under an agreement with NT Power Water may require further action.

Legislation	Type of permit/approval required	Comments
Industrial Chemicals (Notification and Assessment) Act 1989 (Cth)	Dangerous Goods – reagent storage	ERA may require an amendment to Licence 31549 to allow the storage of bulk explosives (Orica Subtek) and any other explosives not otherwise allowed in the licence.
Mining Management Act 2000 (NT)	Ranger Authorisation	<p>The NT maintains an Authorisation for the Ranger operations which fulfils the requirements of the Mining Management Act 2001 (NT).</p> <p>Under the current Ranger Authorisation, ERA is permitted to use the Ranger Project Area as set out in a series of Schedules within the 'Schedule to the Authorisation'.</p> <p>Schedules will require amendment to incorporate the proposed Project, associated infrastructure and activities, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Schedule 2 (2.1.1): to be amended to include the updated underground mine design;</li> <li>• Schedule 2 (2.1.7): Ensure that the mine dewatering treatment plant and disposal to RP2 is incorporated into water management system and approved.</li> <li>• Schedule 3 (3.3.4): update the Ranger mining management plan to include the Project;</li> <li>• Schedule 5: amend to incorporate paste backfilling in the underground workings;</li> <li>• Schedule 8: incorporate requirements for the closure and decommissioning of the Ranger 3 Deeps underground mine workings.</li> </ul> <p>In addition to the schedules above, the environmental monitoring program may require amendment to incorporate requirements and conditions associated with the Project.</p>
Work Health and Safety (National Uniform Legislation) Regulations (NT)	Occupational health and safety – regulatory permits to work	<p>ERA may be required to ensure that relevant individuals hold licences for a number of 'high risk work' activities relating to the Project, as outlined in Schedule 3.</p> <p>Such activities which may arise during the Project include: scaffolding, dogging and rigging, crane and hoist operation.</p>

### 1.3.4.3 Strategies and Policies

In addition to ERA's environmental management system and occupational health and safety management system, which is certified under AS/NZS ISO 14001: 2004 and AS/NZS 4801: 2001, ERA has a number of strategies, policies and best practice principles also incorporated into the management of Ranger's operations. These are summarised below.

### ***ERA policies***

ERA has a suite of policies that establish a clear set of values and objectives for the effective management of health, safety and environmental performance. These include:

- *ERA Diversity Policy*: Outlines the company's commitment and strategies to increase workplace diversity across age, experience, gender and background.
- *ERA Environment Policy*: Describes the company's ongoing commitment to the protection of the natural and cultural values of the surrounding Kakadu National Park.
- *ERA Health and Safety Policy*: Describes the core responsibilities of all company representatives to achieving a zero harm workplace.
- *ERA Radiation Policy*: Describes ERA's core values for the protection of workers, the public and the environment from radiation exposure.

Policies are developed consistent with the intent of the *Rio Tinto Health Safety and Environment Policy*; Rio Tinto health safety, environment and quality management system standard; and ERA standards. In addition, ERA's policies are established consistent with the following standards:

- AS/NZS ISO 14001: 2004 Environmental management systems – Requirements with guidance for use.
- AS/NZS 4801: 2001 Occupational health and safety management systems – Specification with guidance for use.

Policies are reviewed regularly to assess the continuing relevance of the policy within the context of business objectives, operational activities, broader industry initiatives and stakeholder concerns. Key policies and guidelines are listed below:

### ***Australian guidelines and policies***

- *Australia's Uranium Industry Fact Sheet* (RET 2012a);
- *Guide to Safe Transport of Uranium Oxide Concentrate* (RET 2012b); and,
- *Leading Practice Sustainable Development in Mining Handbook* (RET 2011):
  - Airborne Contaminants, Noise and Vibration;
  - Biodiversity Management;
  - Community Engagement and Development;
  - Evaluating Performance: Monitoring and Auditing;
  - Hazardous Materials Management;
  - Managing Acid and Metalliferous Drainage;
  - Mine Closure and Completion;
  - Mine Rehabilitation;
  - Risk Assessment and Management;

- Stewardship;
- Tailings Management;
- Water Management; and
- Working with Indigenous Communities.

### ***International guidelines and policies***

International Atomic Energy Agency – Published Safety Standards (IAEA 2010):

- *Management of Radioactive Waste from the Mining and Milling of Ores Safety Guide;*
- *Occupational Radiation Protection Safety Guide;* and
- *International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources.*

## **1.3.5 Existing Approvals for the Ranger Mine**

Operations at Ranger mine are subject to Commonwealth oversight principally under the Atomic Energy Act, via an authority granted under section 41 and the oversight of the NT Minister of Mines and Energy via the Ranger Authorisation (**Appendix 1**). The Ranger Authorisation sets out the approved conditions under which the Ranger mine must operate and covers aspects of authorised operations including:

- mining operations;
- treatment plant operations;
- operations of tailings repositories;
- other services, operations and requirements;
- water management;
- decommissioning and rehabilitation; and
- environmental and radiation monitoring and reporting.

Three annexures to the Ranger Authorisation describe the environmental monitoring program, the radiation monitoring program and reporting requirements.

In addition to existing approval conditions and EIS approval being sought, ERA will obtain all relevant permits and licences necessary, and amendment to the Ranger Authorisation where required, prior to the commencement of the Project.

## **1.3.6 Land Owners and Key Stakeholders**

### **1.3.6.1 Traditional Owners and Key Representative Bodies**

Summaries of roles and responsibilities of the traditional owners and key stakeholders are provided below.

#### ***Mirarr Traditional Owners***

Aboriginal people have a long and continuing history with Kakadu; some archaeological dating suggests the arrival of people to the region to have occurred between 50,000 and 60,000 years ago (Roberts, *et al.* 1990). The Mirarr people are the traditional owners of the land encompassing the RPA and mining lease MLN1. Mirarr exercise their rights as traditional owners under two Aboriginal Land Trusts and benefit from fee simple title to most of the estate. Mirarr interests are legally represented by the NLC.

#### ***Gundjeihmi Aboriginal Corporation***

At the request of the Mirarr, the GAC was established in 1995 by the NLC to receive royalties from the Ranger mine. In addition to this role, the GAC now functions as a not-for-profit organisation that assists members and other Aboriginal people affected by Ranger mine operations, consistent with Mirarr cultural obligations, across a range of areas from housing to community services to distribution of financial benefits. The GAC assists the Mirarr to protect and advance their rights and interests and to ensure that Mirarr responsibilities and obligations to other Aboriginal people are met.

#### ***Northern Land Council***

The NLC was established under the Commonwealth *Aboriginal Land Rights (Northern Territory) Act 1976* to represent Aboriginal landowners and Aboriginal people in the Top End of the Northern Territory of Australia. The NLC is also the representative body for native title claimants in its area under the Native Title Act 1993. The RPA is not subject to any claims under the Native Title Act 1993. One of the key roles of the NLC is to consult with the Mirarr and affected Aboriginal people with an interest in the land. This consultation is undertaken to ensure the landowners as a group have the chance to express their views and to give their informed consent before the Land Council or a Land Trust enters into any agreement, or takes any action affecting Aboriginal interests in their land.

The representative role of the NLC does not preclude direct dialog between ERA, Mirarr, GAC and other affected Aboriginal people.

### **1.3.6.2 Regulatory Bodies**

Regulatory responsibility for uranium mining in the NT is shared between the Australian and the NT governments. Relevant documents include:

- An agreement between the Commonwealth of Australia and the NT in relation to the principles to be applied in the regulation of uranium mining in the NT. This agreement contains a number of statements, obligations and intentions relating to the sharing of responsibility between the Commonwealth of Australia and the NT in relation to uranium mining.

- A Memorandum of Understanding (commonly referred to as the 'Working Arrangements') which establishes procedures for consultation between the Australian Government's Supervising Scientist and the NT Department of Mines and Energy in the performance of their legislative functions. The 'Working Arrangements' also set out the functions of the MTC – refer **Section 1.3.6.3** below.

### ***NT Department of Mines and Energy***

The NT Department of Mines and Energy is the regulator under the Mining Management Act and the Ranger Authorisation. The Minister for Mines and Energy has responsibility for formal approval of applications for major works at Ranger mine and for example, approval of closure criteria that have been negotiated in the forum of the MTC.

### ***Commonwealth Department of Industry***

The Commonwealth Minister for Industry administers the section 41 Authority under the Atomic Energy Act which authorises ERA to mine, recover, treat and process uranium oxide. The Ranger Environmental Requirements are attached to the section 41 Authority. (Further detail regarding the section 41 Authority is provided in **Annexe B**.)

The Minister for Industry issues ERA's permit to export uranium oxide under the *Customs Act 1901* and the Customs (Prohibited Exports) Regulations 1958. The Minister for Industry approves the Plan of Rehabilitation which is prepared in accordance with the requirements of the Ranger Uranium Project – Government Agreement (as amended and restated on 24 January 2013) between the Australian government and ERA. The Deed stipulates that a Plan of Rehabilitation is to be prepared annually and forms the basis for setting the required value of the Ranger Rehabilitation Trust Fund.

### ***Supervising Scientist Division (SSD)***

The SSD was established following recommendations of the Fox Inquiry<sup>9</sup> and is part of the Department of the Environment.

The head of the Division is the Supervising Scientist, who advises the Australian government on the effects of uranium mining in the Alligator Rivers Region. Reporting to the Supervising Scientist is the Environmental Research Institute of the Supervising Scientist (ERISS), which undertakes research and monitoring into the effects of uranium mining on the environment in the Alligator Rivers Region. The Office of the Supervising Scientist provides supervision, audit, policy and business support.

## **1.3.6.3 Committees and Fora**

### ***Alligator Rivers Region Technical Committee***

The Alligator Rivers Region Technical Committee was established under the *Commonwealth Environment Protection (Alligator Rivers Region) Act 1978* and reviews the appropriateness and quality of scientific research conducted by NT and Australian Government agencies, ERA and others relating to protection of the environment from the potential impacts of uranium mining in the Alligator Rivers Region. Members of the Committee are appointed by the Commonwealth Government Minister for the Environment and include an independent

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<sup>9</sup> Royal Commission into the approval of mining for uranium in the Alligator Rivers Region.

Chairperson, the Supervising Scientist, independent scientific members with specific expertise nominated by the Federation of Australian Scientists and Technological Societies, and representatives of the NLC, NT Department of Mines and Energy, ERA, Uranium Equities Limited (current holder of the Nabarlek lease), and Parks Australia.

The committee recommends research programs and promotes strategies for the efficient coordination and integration of research through agreed Key Knowledge Needs.<sup>10</sup> It meets twice yearly and provides advice to the Commonwealth Minister for the Environment. Committee meeting minutes are available from the Department of the Environment's website.<sup>11</sup>

### ***Alligator Rivers Region Advisory Committee***

The Alligator Rivers Region Advisory Committee was established under the Commonwealth *Environment Protection (Alligator Rivers Region) Act 1978* and facilitates communication between government, industry and community stakeholders on environmental issues associated with uranium mining in the Alligator Rivers Region. The Committee includes representatives from several NT Government departments, Charles Darwin University, Office of the Administrator of the NT, several Australian government departments, non-government organisations, ERA, and other mining companies that operate in the region.

The Alligator Rivers Region Advisory Committee formally convenes twice a year and offers a forum for stakeholders to exchange views and information relating to the protection and rehabilitation of the Alligator Rivers Region environment from any potential effects of uranium mining. Committee meeting minutes are available from the Department of the Environment's website.<sup>12</sup>

### ***Minesite Technical Committee***

The MTC is the formal forum for key advisory and stakeholder groups, including representatives of the NT Department of Mines and Energy (Chair), OSS, ERA, GAC and the NLC,<sup>13</sup> to discuss and resolve technical environmental management issues relating to the operation of the Ranger mine. The MTC discusses matters relevant to the regulatory functions of the NT Government and the supervisory and assessment functions of the Supervising Scientist, as well as operational requirements of ERA and the views of the Mirarr and affected Aboriginal people.

In addition to general business relating to operations at Ranger mine, the MTC addresses:

- practices, procedures and measures for the management, storage and disposal of water, tailings and waste materials;
- performance of the approved water and tailings management systems and structures;
- radiological exposures to workers and members of the public;

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<sup>10</sup> "Key Knowledge Needs" is a collective term for relevant research and studies that will generate knowledge leading to improved management and protection of the Alligator Rivers Region. They include monitoring that will be sufficiently sensitive to assess whether or not the environment is protected to the high standard demanded by the Australian government and community.

<sup>11</sup> [www.environment.gov.au/ssd/communication/committees/arrtc/index.html](http://www.environment.gov.au/ssd/communication/committees/arrtc/index.html)

<sup>12</sup> <http://www.environment.gov.au/node/23142>

<sup>13</sup> The Commonwealth Department of Industry is an observer to the MTC.

- environmental monitoring programs, reports and the environmental impact of mining operations;
- applications for changes to the Ranger Authorisation, including approval to implement site works, where practicable, within the required time frame for action; and,
- rehabilitation planning and works.

The committee makes recommendations for changes to operating and rehabilitation practices at the Ranger mine to the NT Minister for Mines and Energy. Part of the committee's objective is to devise and agree standards and measures for rehabilitation of the RPA.

### ***Kakadu National Park Board of Management and Director of National Parks***

Kakadu National Park surrounds the RPA. Kakadu National Park is Commonwealth land for the purposes of the EPBC Act, and also encompasses several "matters of national environmental significance" as defined under this legislation. Actions that may be taken outside the Park that may have a significant impact on the environment inside the Park are subject to assessment under the EPBC Act.

The Kakadu Board of Management is established under the EPBC Act to manage the Park in conjunction with the Director of National Parks.

The functions of the Board are to make management decisions consistent with the Park management plan and, in conjunction with the Director, to prepare management plans, monitor the management of the Park, and advise the Minister on all future development of the park.

The majority of Board members must be indigenous persons nominated by the traditional owners of the land in the Park.

### ***West Arnhem Shire and town of Jabiru***

The town of Jabiru was established in 1978 and is located on the traditional lands of the Mirarr. Jabiru was originally designed and constructed to house people directly or indirectly associated with uranium mining in the region but a change was made in 1986, allowing tourist accommodation to be established. The Jabiru town area is leased from the Director of National Parks to the Jabiru Town Development Authority. The Jabiru Town Development Authority is a statutory corporation established pursuant to the *Jabiru Town Development Act 1979*, and is responsible to the NT Minister for Local Government, to maintain, administer and develop Jabiru. Following local government reform, the town lies within the West Arnhem Shire, which provides a number of services and functions to Jabiru in conjunction with Jabiru Town Development Authority. Jabiru serves West Arnhem region as a centre for mining, tourism and community services. The current town lease, referred to as the "head lease", was issued in July 1981 and is due to expire in 2021.

### ***Other stakeholders***

The Gagudju Association is an association of Aboriginal people from clans that originally occupied the lands of central and northern Kakadu National Park and the adjoining ERA mining leases. It was established in 1980 to manage royalties payable to these people from uranium sales from the Ranger mine. Its role in this regard has been taken over by GAC,

which was established by the NLC in 1995. It is now an incorporated body and has become the central Aboriginal service and business organisation for its members, as well as investing in tourism ventures including hotels, the Jabiru service station and construction projects.

The Djabulukgu Association was originally formed in 1982, to represent its members in relation to the newly established, jointly managed Kakadu National Park and to receive royalties from park operations and mining. The Djabulukgu Association now has business operations in Kakadu National Park and Jabiru, including a caravan park, and provides services to its members.

### **1.3.7 Inquiries and Assessments of Ranger Mine**

There have been three inquiries into uranium mining since the Australian Government set up the Ranger Uranium Environment Inquiry (more commonly known as the Fox inquiry) in 1975:

- Senate Committee inquiry into uranium mining and milling. Established 2 May 1996; reported 15 May 1997 (Senate Committee 1997).
- Review of environmental regulation at Jabiluka and Ranger uranium mines. This review was announced by the NT Minister, Paul Henderson, in a media release dated 3 June 2002 (Lea 2002).
- Senate Inquiry: Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines (ECITARC 2003).

## **1.4 RANGER 3 DEEPS ENVIRONMENTAL ASSESSMENT PROCESS**

On 16 January 2013, ERA referred the Project under the Australian Government's EPBC Act to the Department of the Environment.<sup>14</sup> Identical documentation to the EPBC Act referral was concurrently submitted as a Notice of Intent to the NT Environmental Protection Authority (EPA), in accordance with the Environmental Assessment Act

On 13 March 2013, the Commonwealth Minister for the Environment determined that the Project was a controlled action (2013/6722) under the EPBC Act. The Project was assessed by the Department of the Environment as having the potential to cause a significant impact on the following matters of national environmental significance (MNES) (prescribed in Part 3 of the EPBC Act):

- World heritage properties (sections 12 & 15A);
- National heritage properties (section 15B and 15C);
- Wetlands of international importance (sections 16 and 17B);
- Listed threatened species and communities (sections 18 & 18A);
- Listed migratory species (sections 20 and 20A);

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<sup>14</sup> Formerly the Commonwealth Dept of Sustainability, Environment, Water, Population and Communities (SEWPaC).

- Nuclear actions (section 21 & 22A); and
- Commonwealth land (sections 26 & 27A).

In addition to the Commonwealth assessment, the Project was also assessed by the NT EPA as having the potential to cause a significant impact on the following matters:

- Potential impacts to regional water resources and dependent ecosystems from the development, operation and closure of the underground mine.
- Creation of new radiation risks with the potential to increase exposure and associated health risks to employees, the public and the environment due to the transition from open-pit to underground mining.
- Potential risk relating to the environment and public safety from the transportation of uranium, explosives (bulk emulsion) and consumables, including dangerous goods, on NT roads.
- Localised impacts from 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 processing the Ranger 3 Deeps ore and associated management of water, tailings and waste streams.
- Potential impacts to stakeholders.
- Potential social, cultural and economic impacts, including the risks of the project not realising its projected economic and social benefits.

Both the Commonwealth Minister and the NT Minister for Mines and Energy, as the responsible officer, determined that formal environmental assessment at the level of an EIS was required. The environmental impact assessment process for the Project from initial proposals to final approval is indicated in **Figure 1-3** (Department of the Environment n.d.; NT EPA n.d.).

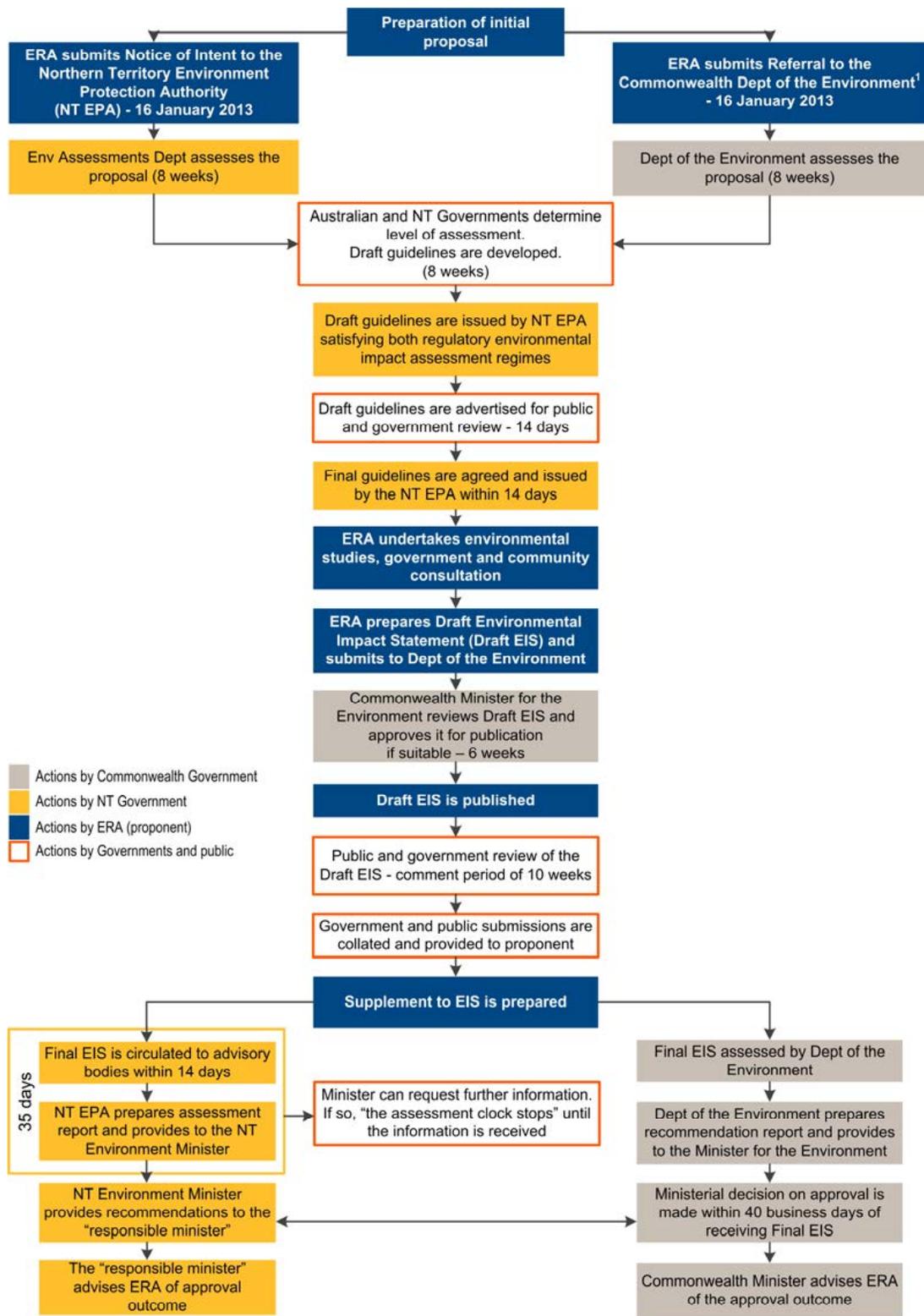


Figure 1-3: Environmental impact assessment process

### 1.4.1 Guidelines Development and Regulatory Assessment

The Commonwealth and NT adopted a joint approach to preparing guidelines for the Draft EIS. In May 2013, the NT EPA and Commonwealth Department of the Environment issued draft guidelines to assist ERA in the production of a single environmental impact assessment document, the *Ranger 3 Deeps Project: draft environmental impact statement* (Draft EIS). Following public comment, the draft guidelines were finalised by the agencies and subsequently issued to ERA on 2 August 2013.

The Draft EIS guidelines identify matters of concern and provide the general basis for studies across a range of environmental, social and economic aspects, required to assess the potential impacts of the Project and to allow the authorities to make a final decision concerning its acceptability.

The Draft EIS is designed to satisfy the environmental requirements of both the Australian and NT governments. Assessment of the Draft EIS will be undertaken in accordance with the Commonwealth's EPBC Act and the NT's Environmental Assessment Act. The Draft EIS guidelines and a cross-reference table comparing the guidelines with this document are provided in **Appendix 2** and **Appendix 3**, respectively.

### 1.4.2 Draft EIS Scope

The Draft EIS provides an assessment of activities associated with the proposed Project. It is outside this scope to otherwise assess the existing activities and operations at Ranger mine (including the exploration decline). This is consistent with the project description as outlined in the referral and Notice of Intent, and the intent of the EPBC Act and EA Act, respectively.

The Draft EIS therefore addresses the following Project components and activities, across all project phases:

- Aboveground infrastructure and activities: extension of the ventilation system (including vent shafts, refrigeration units, power circulation to fans and paste plant, and additional power generation);
- Underground mining: underground drive and stope developments and subsequent paste backfill;
- Incremental changes to closure planning and long-term waste management strategies;
- Environmental, social and traffic risk/impact assessments for identifying, assessing and managing hazards, risks and benefits associated with the Project, from a local, regional and national perspective.

### 1.4.3 Stakeholder Consultation

Throughout the Draft EIS preparation process there was opportunity for consultation and comment, including through studies, such as the Social Impact Assessment. Company personnel are in frequent, regular contact with the GAC, the NLC and regulatory authorities, both informally and through the MTC.

The mechanisms that support this engagement and communications include: one-on-one meetings; formal committees (such as the MTC, ARRTC and ARRAC); the ERA website; quarterly business updates; regular briefings; workshops; and Jabiru community bulletins.

Through the assessment process there was opportunity for consultation and comment including through studies, such as the Social Impact Assessment and the Draft EIS. Comments on the Draft EIS can be made as written or online submissions either to ERA or the NT EPA (refer **Executive Summary; How to Make a Submission**).

ERA commenced a social impact assessment in mid-2013. The purpose of the assessment was to establish an understanding of social and socio-economic aspects at a national, territory, regional (Alligator Rivers Region) and local (Jabiru) level that could be affected by the Project and to analyse relevant impacts. The outcome of this analysis was the development of a social impact management plan. A full description of the stakeholder engagement process and social impact assessment is described in **Chapter 11**.

#### 1.4.4 Preparation of the Draft EIS

ERA commissioned a number of targeted studies and surveys to address the guidelines and support this Draft EIS. These studies are summarised in **Table 1-2**.

Table 1-2: Studies conducted for the environmental impact assessment of the Project

Study	Organisation/ consultant	Study components
Air quality	Pacific Environment Ltd	<ul style="list-style-type: none"> <li>Establish a representative meteorological model.</li> <li>Identify Project emission sources and run a predictive emissions model.</li> <li>Identify existing emission sources and run a predictive emissions model.</li> <li>Assess predicted cumulative emissions at defined receptor locations.</li> </ul>
Assessment of potential effects of solute loading to Magela Creek from Ranger 3 Deeps closure strategy	Rio Tinto	<ul style="list-style-type: none"> <li>Ecological assessment of the potential impacts from solutes dispersion based on a critical review of: <ul style="list-style-type: none"> <li>the groundwater modelling predictions for loads of COPC that may enter Magela Creek after Ranger 3 Deeps closure,</li> <li>the toxicity of the contaminants potentially entering/could enter the creek, particularly magnesium, manganese and uranium, to local species, and</li> <li>existing water quality and biological results from the environmental monitoring programs.</li> </ul> </li> </ul>
Best Practicable Technology (BPT) assessments	Dr Arthur Johnston	<ul style="list-style-type: none"> <li>To assess options and elements of the Project.</li> <li>Demonstrate that the Project represents BPT against the MTC endorsed criteria.</li> </ul>
Environmental Risk Assessment	Dr William Danaher RMI Pty Ltd	<ul style="list-style-type: none"> <li>Identify and discuss the full range of risks presented by the Project, including those of concern to the public.</li> <li>Identify relevant impacts.</li> </ul>

Study	Organisation/ consultant	Study components
		<ul style="list-style-type: none"> <li>• Quantify and rank risks so that the reasons for proposed management responses are clear.</li> <li>• Identify levels of any uncertainty about estimates of risk and the effectiveness of risk controls in mitigating risk.</li> </ul>
Flow and solute transport modelling	Intera Incorporated: Geoscientists and engineers	<p>Based on extensive ongoing Ranger mine closure studies and utilising computational modelling and empirically derived hydrogeological data:</p> <ul style="list-style-type: none"> <li>• Establish the interaction between backfill solutes in the closed-out pits and Ranger 3 Deeps.</li> <li>• To characterise groundwater flow from the backfilled Ranger 3 Deeps to the Magela Creek.</li> <li>• Assess transport of solutes of Ranger 3 Deeps to Magela Creek.</li> <li>• Estimate of temporal volume of mine water inflow.</li> <li>• Assess the potential for near surface/groundwater drawdown.</li> </ul>
Hydrology	Hydroresolutions	Straddle-packer hydraulic testing to facilitate the numerical modelling of solute egress from Pit 3 and groundwater inflow to, and solute egress from the proposed under-ground mine.
Noise and vibration	SLR Consulting Australia Pty Ltd	<ul style="list-style-type: none"> <li>• Identify Project noise emission sources and run a predictive emissions model.</li> <li>• Identify existing noise emission sources and run a predictive emissions model.</li> <li>• Assess predicted cumulative noise emissions at defined receptor locations.</li> <li>• Identify sources of vibration associated with the Project and predict vibration at defined cultural heritage and environmental receptors.</li> </ul>
Radiation	JRHC Enterprises Pty Ltd	<p>As part of the environmental assessment process for development of the Ranger 3 Deeps underground mine, the current environmental radiological conditions were determined. This radiation baseline work consisted of two main phases of work:</p> <ul style="list-style-type: none"> <li>• A literature review of all historic monitoring by ERA and others; and</li> <li>• A radiation monitoring program consisting of the following key elements: <ul style="list-style-type: none"> <li>• long lived alpha activity in dust (i.e. dust deposition and airborne concentrations);</li> <li>• radon;</li> <li>• external gamma; and</li> <li>• soils and sediments.</li> </ul> </li> </ul>
Social impact assessment	Banarra	<ul style="list-style-type: none"> <li>• Comprehensive consultation with key stakeholder organisations and a range of indigenous and non-indigenous stakeholders, other non-government organisations, government departments and, local and regional businesses.</li> <li>• An analysis of identified opportunities and risks that have the</li> </ul>

Study	Organisation/ consultant	Study components
		<p>potential to create social impacts related to the Project, focussing on 10 key aspects of the social environment.</p> <ul style="list-style-type: none"> <li>• Development of a social impact management plan.</li> </ul>
Traffic impact assessment	GHD Pty Ltd	<ul style="list-style-type: none"> <li>• Identify proposed transport routes to move equipment, materials and personnel for the Project.</li> <li>• Assess the capacity of the transport route to accommodate future ERA and other user traffic volumes.</li> <li>• Identify risks to public health and safety, environmental values and species of conservation significance.</li> <li>• Quantify incident likelihood.</li> <li>• Assess the adequacy of current transport controls relative to risk profile.</li> </ul>
Vegetation and fauna assessment	Eco Logical Australia	<p>Key survey objectives:</p> <ul style="list-style-type: none"> <li>• Increase baseline knowledge of vegetation, flora, fauna and fauna habitat within and surrounding the nominated impact/study area.</li> <li>• Establish the presence of threatened and migratory species in the area surrounding the mine site and determine if and how these populations may be utilising/frequenting the nominated impact/study area.</li> <li>• Use survey results and outcomes of desktop review of historical data to evaluate the relative value, role and functions of the impact/study area to threatened and migratory species and to environmental values and attributes that are associated with the World Heritage listing of Kakadu National Park, National Heritage places, and wetlands of international importance with a focus on threatened and migratory species.</li> <li>• Describe the potential significance of the impact of the Project in consideration of the above.</li> </ul>

In addition to the targeted studies above, ERA commissioned and/or undertook in-house, a range of technical studies. The purpose of these studies was to develop, assess and optimise the Project design. These studies were integrated with the risk analysis and environmental impact studies, incorporating control elements (treatments) to manage or mitigate the risks identified.

#### 1.4.5 Government and Public Review of the Draft EIS

The Draft EIS was initially provided to the Commonwealth Department of the Environment to ensure that it provided sufficient information for the public to make an informed decision.

The Draft EIS is now submitted for public comment.

#### 1.4.6 Preparation of the Final EIS

ERA will prepare an "EIS Supplement" to fulfil its obligations under the Commonwealth EPBC Act and NT Environmental Assessment Act. Together with the Draft EIS, the EIS Supplement constitutes the "Final EIS".

The purpose of the EIS Supplement is to address each relevant issue raised during the public review and comment period, either by clarification or through further investigations and studies. The Final EIS is submitted to the responsible Commonwealth and NT ministers, who will determine the environmental acceptability of the Project, within 40 and 35 days respectively, of receipt of the document.

## 1.5 DOCUMENT STRUCTURE

The Draft EIS has been prepared in accordance with the *Guidelines for preparation of an environmental impact statement: Ranger 3 Deeps underground mine, Energy Resources of Australia Ltd (Appendix 2)*. The Draft EIS includes an executive summary, main report and technical reports generated by the studies listed previously in **Table 1-2** and presented as appendices. The main report comprises:

**Chapter 1 Introduction and context** (this chapter) provides an overview of ERA, including the regulatory regime under which Ranger mine operates, as well as a summary of government inquiries relevant to Ranger mine. The chapter also includes a summary of the EIA process for the Project.

**Chapter 2 Existing environment** provides an overview of the natural and operational environment of the existing Ranger mine. Its purpose is to provide a setting to the Project description outlined in Chapter 3 and encompasses a substantial dataset that has been accumulated by ERA and regulators from more than 30 years of environmental, safety and health monitoring and research investigations of the operations at Ranger mine.

**Chapter 3 Project description** provides a comprehensive description of the Project and associated infrastructure. Major chapter elements include: Underground mine design and operations; construction on operation of surface infrastructure; interface with existing processing plant; and closure aspects, including progressive backfill.

**Chapter 4 Alternatives** describes Best Practicable Technology (BPT) methodology and outcomes applied to the Project. A key aspect of the BPT is the identification of Project alternatives, discussed in this chapter. Chapter 4 also identifies the options that represent BPT, which provides the basis for the Project description (Chapter 3) and were subsequently taken forward into the risk assessment.

**Chapter 5 Risk assessment** outlines ERA's method for assessing the environmental risks associated with the Project.

**Chapter 6 Emissions** describes the air quality, greenhouse and energy emissions, and noise and vibration emissions that will be produced during the Project. Each aspect of air quality also addresses cumulative impacts associated with the Project and proposed mitigation measures (treatments).

**Chapter 7 Human health and safety** outlines the health and safety management system and framework employed at ERA. This chapter considers the potential new safety and health impacts that could arise from the Project, including the identification of specific safety and health issues that arise from the Project; a description of the systems that will be used to manage safety and health, and control hazards and risks; and the identification of residual occupational health and safety impacts once control measures are in place.

**Chapter 8 Water** assesses the risk presented by the Project with respect to environmental values associated with both groundwater and surface water. It also includes discussion the broader aspects of these elements as required by the EIS guidelines.

**Chapter 9 Flora and fauna** presents information on the potential impacts of the Project in relation to listed flora and fauna. Also presented are the outcomes of the flora and fauna studies in the areas adjacent to the Project, undertaken by Eco Logical Australia.

**Chapter 10 Cultural and historic heritage** provides an overview of ERA's existing cultural heritage management system and framework, and Project risk profile. Also presented are details of the cultural environment relating to ERA's Ranger mine and the Project, which are located on the traditional lands of the Mirarr.

**Chapter 11 Social and economic considerations** provides detailed information about the local and regional community in terms of social and economic factors. The chapter content is generated from a social impact assessment and socio-economic report commissioned by ERA for the proposed Project.

**Chapter 12 Transportation** describes the risk assessment evaluation process and outcomes associated with the transport of materials for the Project along the existing primary road network being the Stuart Highway, Arnhem Highway and Kakadu Highway. An assessment of the incremental change in risk profile is discussed along with a summary of the consultant's review of existing traffic safety management practices.

**Chapter 13 Closure and rehabilitation** describes the environmental risks associated with the Project's closure and rehabilitation activities. Also described in this chapter are the mitigation measures (treatments) proposed to address these risks in the form of the Project closure strategy; and how the proposed strategy will be integrated into the overall Ranger mine closure planning.

**Chapter 14 Matters of National Environmental Significance** describes each of the Matters of National Environmental Significance (MNES) that could be affected by the Project including potential impacts, likelihood of occurrence and consequence. Also described are the existing controls and new treatments that ERA will implement through project design, construction, operations and decommissioning to mitigate impacts on these values.

**Chapter 15 Environmental management framework** outlines the design and planning issues relating to effective environmental and social management of the Project, in the form of action plans across key environmental aspects. These plans will be integrated into the existing Ranger mine environmental and occupational health and safety management systems and plans, which conform to AS/NZS ISO 14001:2004 and AS/NZS 4801:2001 Standards.

## 1.6 REFERENCES

*Environment Protection and Biodiversity Conservation Act 1999*, Australian Government, Act No 91 of 1999 as amended. Viewed online:

Commonwealth of Australia (2002) *Senate Environment, Communications, Information Technology and the Arts References Committee: Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines*, Official Committee Hansard, 30 September 2002, Darwin, <[http://parlinfo.aph.gov.au/parlInfo/download/committees/commsen/5820/toc\\_pdf/1981-2.pdf;fileType=application%2Fpdf#search=%22committees/commsen/5820/0015%22](http://parlinfo.aph.gov.au/parlInfo/download/committees/commsen/5820/toc_pdf/1981-2.pdf;fileType=application%2Fpdf#search=%22committees/commsen/5820/0015%22)>. Viewed online: 18 August 2014. p 126.

Department of the Environment (n.d.) *Environment assessment process: EPBC Act fact sheet*. <<http://www.environment.gov.au/resource/environment-assessment-process>>. Viewed online: April 2014.

Dept of Resources Energy and Tourism (2011) *Leading Practice Sustainable Development Program Handbooks*. Canberra, Australian Government.

Dept of Resources Energy and Tourism (2012a) *Australia's Uranium Industry*. <<http://www.ret.gov.au/resources/Documents/Mining/uranium/Uranium-Industry-factsheet.pdf>>. Viewed online: January 2013.

Dept of Resources Energy and Tourism (2012b) *Guide to Safe Transport of Uranium Oxide Concentrate*, Australian Government, p 74. <<http://www.ret.gov.au/resources/documents/mining/uranium/guide-to-safe-transport-of-uoc.pdf>>.

International Atomic Energy Agency (2010) *Occupational Radiation Protection in the Mining and Processing of Raw Materials Safety Guide IAEA Safety Standards Series No. RS-G-1.6. Date of Issue: Friday, 25 June, 2004* International Atomic Energy Agency, <[www-pub.iaea.org/MTCD/publications/PDF/Pub1183\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1183_web.pdf)>. Viewed online: 11 April 2010.

Lea, D (2002) *Review of environmental regulation at Jabiluka and Ranger uranium mines*, Department of the Chief Minister, Northern Territory Government, September 2002, p 38.

Northern Territory Environment Protection Authority (n.d.) *Guide to the EIA Process in the NT: Environmental impact assessment flow chart*. <<http://www.ntepa.nt.gov.au/environmental-assessments/eiaguide>>. Viewed online: April 2014.

Roberts, R, Jones, R & Smith, M A (1990) 'Thermoluminescence dating of a 50,000-year-old human occupation site in northern Australia', *Nature* 345: 153-156.

Senate Committee (1997) *Uranium mining and milling in Australia*, Senate Uranium Mining and Milling Committee, <[http://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Former\\_Committees/uranium/report/b02](http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Former_Committees/uranium/report/b02)>. Viewed online: April 2014.

Senate Environment Communications Information Technology and the Arts Committee (2003) *Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines*, Commonwealth of Australia, <[http://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Environment\\_and\\_Communications/Completed\\_inquiries/2002-04/uranium/report/index](http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Completed_inquiries/2002-04/uranium/report/index)>. Viewed online: April 2014.

Supervising Scientist (1983) *Annual Report 1982-83*, Supervising Scientist for the Alligator Rivers Region, Darwin, 2001, p 144.

Supervising Scientist (1996) *Annual Report 1995-96*, Supervising Scientist for the Alligator Rivers Region, Darwin, p 159.

Supervising Scientist (2002) *Annual Report 2001-2002*.

<<http://www.environment.gov.au/archive/about/publications/annual-report/01-02/index.html>>.

Viewed online: 25 June 2013.

Supervising Scientist (2003) *Annual Report 2002-2003*.

<<http://www.environment.gov.au/ssd/publications/ss02-03/index.html>>. Viewed online: 25 June 2013.

Supervising Scientist (2004) *Annual Report 2003-2004*.

<<http://www.environment.gov.au/ssd/publications/ss03-04/index.html>>. Viewed online: 25 June 2013.

## ANNEXE A: RANGER MINE TIMELINE

Date	Description of event
1969	Ranger mine orebodies discovered by joint venturers Electrolytic Zinc Company of Australasia Ltd (EZ) and Peko-Wallsend Operations Limited (Peko).
1974	The Australian Government, through the Australian Atomic Energy Commission, agrees to finance 72.5% of the project and sell the uranium, with 50% of the net proceeds distributed to the joint venturers.
Feb 1974	Submission of Environmental Impact Statement (and supporting material) under the Australian Government's <i>Environmental Protection (Impact of Proposal) Act 1974</i> .
May 1975	Submission of Supplements 1 and 2 to Environmental Impact Statement.
1975	The Ranger Uranium Environmental Inquiry (Fox inquiry) is established.
1977	Final Fox report (second report) recommends that uranium mining proceed.
1978	An agreement (section 44 Agreement) covering mining is signed with the Northern Land Council, representing the interests of the Aboriginal owners of the area.
1979	section 41 Authority under the Australian Atomic Energy Act is issued. Construction at Ranger mine commences.
1980	ERA is established as a public company. It is the largest public float in Australian history. Using open cut methods, mining of Pit 1 ore body commences in May 1980.
1981	The first drum of uranium oxide is produced on 13 August 1981.
1994	Mining of Pit 1 orebody is completed in December 1994 after recovering 19.78 million tonnes of ore at an average grade of 0.321%.
1996	Final approval to mine Pit 3 orebody is received from the Northern Territory Government in May.
1997	Open cut mining of orebody #3 commences in July 1997, with mining expected to continue until at least 2009.
2001	Rio Tinto acquires North Limited, the previous major shareholder in ERA Limited.
2006	In October 2006, ERA announces an increase in Ranger mine's reserves as a result of a reduction in cut-off grade of stockpiled and yet to be mined ores for processing, adding approximately six years to the predicted life of operations at Ranger to 2020.
2007	In September 2007, ERA announces an extension to the Ranger mine operating Pit 3, from Shell 12 to Shell 50, which extends mining at Ranger until 2012. ERA also announces expenditure of A\$10 million for a pre-feasibility study to examine options to extend the mine further and to increase production from the processing plant.
2008	In November 2008, ERA announces a significant mineral exploration target defined at Ranger 3 Deeps of 15 – 20 million tonnes with a potential for 30,000 – 40,000 tonnes of contained uranium oxide.
Mar 2009	On 16 March 2009, ERA submits a referral to the Australian Government Environment Minister for the assessment of the proposed action: <i>Heap leach facility for Energy Resources of Australia Ltd's Ranger uranium mine</i> . At the same time, ERA submits a notice of intent to the NT Government for the proposed

Date	Description of event
	<p>action.</p> <p>On 15 April 2009, both Governments' determined that the proposed action required further assessment to the level of an environmental impact assessment and issued EIS guidelines under the bilateral agreement.</p> <p>On 4 August 2011, ERA announced that the heap leach proposal was withdrawn from further environmental impact assessment.</p>
Apr 2009	<p>On 15 April 2009, a referral and notice of intent was submitted under the Commonwealth EPBC Act and NT Environmental Assessment Act respectively for assessment of the proposed action: <i>Ranger Uranium Mine Exploration Decline</i> (EPBC 2009/4860).</p> <p>On 17 May 2009, the Australian Government determines that the project is not a controlled action under the EPBC Act; on 16 July 2009, NT Government advised that the project did not require formal assessment under the Environmental Assessment Act.</p>
July 2010	<p>ERA submits an Application for approval to the MTC for the construction of an exploration decline and completion of Phase I underground exploration works for Ranger 3 Deeps. After additional revisions to the Application, it is approved by the NT Government, in September 2011.</p>
May 2012	<p>Ground breaking of the Ranger 3 Deeps exploration decline occurred on 1 May 2012 with the box cut and portal access completed in October 2012. As at 31 December 2012, development of the exploration decline had progressed to 57 m.</p>
Nov 2013	<p>Mining in Pit 3 ceases.</p>
Jan 2013	<p>On 16 January 2013, ERA submits a referral and notice of intent was submitted under the Commonwealth EPBC Act and NT Environmental Assessment Act respectively for the Ranger 3 Deeps underground mine (EPBC 2013/6722).</p> <p>On 13 March, both Governments advise ERA that the proposal requires assessment by draft EIS. The assessment process is a joint NT and Australian Government assessment with one set of EIS guidelines being issued to ERA on 2 August 2013.</p>
May 2013	<p>ERA submits an Application for approval to the MTC for the construction of Phase II of the Ranger 3 Deeps exploration decline. Phase II includes extension of the exploration decline to the 3,000 m, installation of a ventilation shaft and acquisition of a bulk sample for test work purposes.</p> <p>The Phase II Application is approved by the MTC in June 2013.</p>

## ANNEXE B: LEGISLATIVE AND REGULATORY FRAMEWORK

### Regulation relevant to uranium oxide product

Act/Regulation/Agreement	Description
<p>Atomic Energy Act 1953 (Cth)</p> <p>Administered by: Dept of Industry</p>	<p>Pursuant to the <i>Atomic Energy Act 1953</i> (Cth), title to all prescribed substances in the NT of Australia (which includes uranium oxide) is owned by the Australian government.</p> <p><i>"(a) uranium, thorium, an element having an atomic number greater than 92 or any other substance declared by the regulations to be capable of being used for the production of atomic energy or for research into matters connected with atomic energy; and</i></p> <p><i>(b) any derivative or compound of a substance to which paragraph (a) applies."</i></p> <p>The Act establishes the process for authorising the mining, recovering, treatment and processing of prescribed substances in the NT of Australia. The Act does not exclude or limit the operation of any Territory law that is capable of operating concurrently.</p> <p>Part III of the Act specifically covers the RPA (in full).</p>
<p>section 41 Authority under the Atomic Energy Act</p>	<p>The responsible Australian Government Minister granted ERA an authority (commonly referred to as the "section 41 Authority") under the Atomic Energy Act to mine, recover, treat and process uranium oxide (a "prescribed substance") at Ranger mine.</p> <p>The Environmental Requirements are attached to the section 41 Authority and form a condition of the Authority. The section 41 Authority also states that ERA must comply with the "Complementary Agreement", "Government Agreement" and "Mining Agreement".</p> <p>The section 41 Authority requires ERA to keep proper records and provide information to the Minister on receipt of notice. It also provides for the termination of mining and processing operations by 8 January 2021.</p> <p>The Minister is empowered to vary the section 41 Authority (including imposing an indefinite suspension of operations) if ERA refuses or fails to comply with or observe a condition or restriction provided in the section 41 Authority.</p>
<p>Environmental Requirements</p>	<p>The Ranger Environmental Requirements are attached to the section 41 Authority and set out Primary and Secondary Environmental Objectives which establish the principles by which the Ranger mine is to be conducted, closed and rehabilitated and the standards that are to be achieved.</p> <p>The Primary Environmental Objectives relate to environmental protection and rehabilitation. They dictate that present and future activities at Ranger mine must not impact upon the values, attributes and ecosystem health of Kakadu National Park, nor the health of the regional community. They require that the site be rehabilitated to establish an environment such that it could be incorporated into Kakadu National Park.</p> <p>The Secondary Environmental Objectives deal with a number of particular aspects of environmental management which are to be specifically addressed and reported on, including water quality, air quality and hazardous substances, to ensure that the Primary Environmental Objectives are not compromised.</p> <p>The Environmental Requirements include monitoring and reporting obligations, both on a periodic basis and in response to incidents, including any mine-related event "which is of or, could cause, concern to Aboriginals or the broader public."</p> <p>The Environmental Requirements also include a number of conditions relating to the protection of Aboriginal cultural heritage. For example: conducting operations at Ranger mine so as to maintain and not damage the attributes for which Kakadu National Park was inscribed on the World Heritage List; managing air quality to</p>

Act/Regulation/Agreement	Description
	<p>ensure there is no physical or chemical detriment to any known sites of Aboriginal culture or heritage; ensuring that detonation of explosives does not damage Aboriginal cultural and heritage sites of significance.</p>
<p>section 44 Agreement</p>	<p>In exercising powers under the Atomic Energy Act, the Commonwealth Minister is not permitted to act in a manner that is inconsistent with the obligations of the Commonwealth under the <i>Aboriginal Land Rights (Northern Territory) Act</i>.</p> <p>Before the Australian Government could grant the section 41 Authority to operate Ranger mine under the Atomic Energy Act, the Commonwealth had to enter into an agreement with the Northern Land Council (the body representing traditional owners) under the <i>Aboriginal Land Rights (Northern Territory) Act</i> in relation to payments to be made to the NLC and conditions for operating the Ranger mine. This agreement was made under the then section 44 (2) of the Act. This agreement is commonly referred to as the "section 44 Agreement". The term (duration) of the "section 44 Agreement" was the same as the section 41 Authority. The re-negotiated "section 44 Agreement" was finalised in January 2013.</p> <p>The section 44 Agreement reflects the environmental requirements, includes provisions for the Commonwealth to make payments to the NLC and provisions relating to:</p> <ul style="list-style-type: none"> <li>local business development;</li> <li>control of liquor;</li> <li>restricted areas;</li> <li>rights of Traditional Owners;</li> <li>sacred sites;</li> <li>employment and training of local aboriginal employees;</li> <li>Aboriginal liaison committee; and</li> <li>Inductions re Aboriginal culture.</li> </ul> <p>This agreement is confidential to the signatory parties.</p>
<p>Government Agreement</p>	<p>The Commonwealth entered into a separate agreement with ERA's predecessor (Peko-Wallsend Operations Ltd, Electrolytic Zinc Company of Australasia Ltd) called "the Government Agreement". This agreement reflected the terms of the section 44 Agreement and now, through various deeds of assignment, it applies to ERA.</p>
<p>Extension Agreement</p>	<p>The original section 41 Authority under the Atomic Energy Act was entered into in 1979 and ran for 26 years (21 years of mining and 5 years rehabilitation), with mining due to cease in 2000. The Commonwealth needed to negotiate a new section 44 new agreement with the NLC before it could grant a new section 41 Authority under the Atomic Energy Act to allow ERA to continue its operations.</p> <p>During the period 1996 to 1999, the Commonwealth sought to negotiate a new section 44 agreement with the NLC, but agreement could not be reached. During the arbitration process, the arbitrator suggested that the parties roll over the existing section 44 agreement and enter into an "agreement to agree" on a new section 44 agreement. In March 1999, the Commonwealth and NLC entered into a Deed (Extension Agreement), which extended the section 44 agreement for a further 26 years (21 years mining, 5 years rehabilitation) and required the parties to agree on a new section 44 agreement. This agreement is now superseded by the re-negotiated section 44 agreement.</p>

Act/Regulation/Agreement	Description
Complementary Agreement	In March 1999, ERA, the Commonwealth and NLC entered into a "Complementary Agreement" to complement the terms of the extension agreement between the Commonwealth and the NLC. The Complementary Agreement effectively rolls over the terms of the section 44 agreement and binds ERA to the arrangement. In addition, under this complementary agreement ERA has agreed to enter into a "mining agreement" with the NLC.
Mining Agreement	The "mining agreement" is the agreement between ERA and the NLC as contemplated by the Complementary Agreement. This was signed on 24 January 2013.
<i>Customs Act 1901</i> (Cth) Administered by: Department of Immigration and Border Protection	This Act controls the export and import of goods. ERA's product is a prohibited export under this Act and requires a permit to export.
Customs (Prohibited Exports) Regulations Administered by: Department of Immigration and Border Protection	ERA's licence/permit to export is issued under the Customs (Prohibited Exports) Regulations 1958. ERA's current Export Permit requires ERA to comply with the Environmental Requirements set out in a Schedule to the section 41 Authority. The permit requires 6 monthly reports to the Minister for Industry and for new contracts and variations to contracts to also be forwarded to the Minister.
<i>Australian Radiation Protection and Nuclear Safety Act 1998</i> (Cth) Administered by: Department of Health	This Act provides for the establishment of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) which prepares draft policies, codes and standards pertaining to radiation protection and nuclear safety. The Codes have no statutory force, but may be given legal effect through reference in regulatory approvals in Australian and Territory legislation.
<i>Nuclear Non-Proliferation (Safeguards) Act 1987</i> (Commonwealth) Administered by: Department of Foreign Affairs and Trade	The Act gives effect to certain obligations that Australia has as a part of the Non-Proliferation Treaty and associated agreements. The Act requires permits for use of nuclear material and establishes offences (e.g. for unlicensed use, stealing). ERA's Permit to Possess Nuclear Material includes conditions relating to the means and routes by which the nuclear material is transported, the measures to ensure the physical security of the material, the records to be kept and the reports to be furnished in respect of the transport of the material or item.  The Act provides authorised inspectors with wide powers to determine compliance with the Act and permit and establishes the Australian Safeguards Office, which is one of the government agencies that form the Australian Safeguards and Non-Proliferation Office (ASNO).
<i>Nuclear Safeguards (Producers of Uranium Ore Concentrates) Charge Act 1993</i> (Commonwealth) Administered by: Department of Foreign Affairs and Trade	This Act provides that if a permit holder under the <i>Nuclear Non-Proliferation (Safeguards) Act 1987</i> produces more than 1,000 kilograms of uranium ore concentrates at a processing facility and exports this product, a charge may be levied. The Act provides for each producer to pay an annual charge, prescribed by regulation.
<i>Radioactive Ores and Concentrates (Packaging and Transport) Act</i> (NT) Administered by: Department of Business	This Act requires ERA or its agent to have a licence to transport radioactive material (e.g. uranium oxide). ERA must also have a licence to store the material. ERA's licence provides for transportation and storage in Darwin and is renewed every 12 months.
Code of Practice for Safe Transport of Radioactive Material (2008) Administered by: ARPANSA	The Code of Practice for Safe Transport of Radioactive Material has been adopted under the provisions of the <i>Radioactive Ores and Concentrates (Packaging and Transport) Act 1980</i> (NT) and is a mandatory Code for ERA.  This Act does not apply to any aspect of ERA's processes for producing and handling of uranium ore or oxide but requires a licence for ERA's density gauges and irradiating apparatus.

Act/Regulation/Agreement	Description
<p><i>Radiation Protection Act</i> (NT) Administered by: Department of Health</p>	<p>The Radiation Protection Act came into effect in October 2009, repealing the <i>Radiation (Safety Control) Act 1978</i> (NT). The Act applies to the manufacture, sale, acquisition, possession, use, storage, transport and disposal of a radiation source but can include any activity that is connected with radiation practices.</p>
<p><i>Mining Management Act 2001</i> (NT) Administered by: Department of Mines and Energy</p>	<p>The Mining Management Act is the primary legislation governing mining in the NT and specifically addresses environmental management, health and safety on mine sites.</p> <p>The Act also covers control of the mine site, the issuing of Authorisations to mine, requirements for Mining Management Plans, the establishment of the Mining Board, appointment of mining officers and their powers, and establishes offences under the Act.</p> <p>Before exercising a power or performing a function in relation to the Ranger Authorisation, the NT Minister must consult with the Commonwealth Minister administering the Atomic Energy Act about matters agreed in writing between them relating to the mining of uranium and, must act in accordance with any advice provided by the Australian Government Minister.</p> <p>The Act requires the Ranger Authorisation to incorporate or adopt by reference the Ranger Environmental Requirements.</p>
<p>Ranger Authorisation and Schedule to Authorisation Administered by: Department of Mines and Energy</p>	<p>The NT maintains an Authorisation for the Ranger operations which fulfils the requirements of the <i>Mining Management Act 2001</i> (NT).</p> <p>The Ranger Authorisation has evolved over time resulting from extensive dialogue with regulators, through the MTC, to meet changing expectations with changes ultimately being approved by the NT Minister of Mines and Energy.</p> <p>Before exercising a power or performing a function in relation to the Ranger Authorisation, the NT Minister must consult with the Commonwealth Minister administering the Atomic Energy Act about matters agreed in writing between them relating to the mining of uranium and, must act in accordance with any advice provided by the Australian Government Minister.</p> <p>The Schedule of Ranger Authorisation contains the key terms of ERA's licence to operate. The Schedule to the Ranger Authorisation reflects the Environmental Requirements and contains additional prescriptive requirements aimed at protecting the environment from any potential effects of mining uranium. It also contains more detailed provisions relating to monitoring, reporting and record keeping.</p> <p>Under the current Ranger Authorisation, ERA is permitted to use the RPA as set out in a series of Schedules within the 'Schedule to the Authorisation'.</p> <p>The MTC and the stakeholder Routine Periodic Inspections provide a compliance monitoring and reporting system in support of the Ranger Authorisation.</p> <p>A breach of the Authorisation is an offence under the Act and carries a maximum penalty of \$137,500.</p>
<p>Code of Practice and Safety Guide on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005) Administered by: ARPANSA</p>	<p>As part of its Ranger Authorisation under the Mining Management Act, ERA is required to abide by the provisions in the Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores (1987) in relation to maintaining a list of "designated employees" who access "controlled" or "supervised" areas and doses must be calculated in accordance with the Code.</p>
<p>Agreement between the Commonwealth of Australia and the NT in relation to principles to be applied in the regulation of uranium mining in the</p>	<p>The Mining Management Act provides that before exercising a power or performing a function in relation to the Ranger Authorisation, the NT Minister must consult with the Commonwealth Minister administering the Atomic Energy Act about matters agreed in writing between them relating to the mining of uranium or</p>

Act/Regulation/Agreement	Description
NT	<p>thorium; and, must act in accordance with any advice provided by the Commonwealth Government Minister.</p> <p>The 'matters agreed in writing between' the Australian and NT Ministers (referred to above) are principally contained in the Agreement between the Commonwealth of Australia and the NT of Australia in relation to principles to be applied in the regulation of Uranium Mining in the NT of Australia (dated 17 November 2000). In this document the Commonwealth of Australia and the NT agree, at Clause 5, to:</p> <p><i>"...recognise the basic principle that the Territory shall consult with the Commonwealth in respect of matters agreed in writing between them relating to the mining of prescribed substances in the Territory. The Territory Minister shall act in accordance with any advice on the matter which is provided by the Australian Government Minister."</i></p> <p>This agreement contains a number of statements, obligations and intentions relating to the sharing of responsibility between the Commonwealth of Australia and the NT in relation to uranium mining.</p> <p>Although the NT Minister is the Supervising Authority for the ERs, the Commonwealth Government Minister has the primary decision-making role. As described by Senator Minchin, the then Minister for Industry, Science and Resources, the settled form of the Environmental Requirements is outlined below:</p> <p><i>"... the attached [Environmental Requirements] provide for direct intervention by myself on key issues where the Commonwealth considers it appropriate. In exercising this role, I would be taking advice from the Supervising Scientist. The NT would retain its day-to-day regulatory responsibilities."</i></p>

## Regulation relevant to Aboriginal land ownership

Act/Regulation	Description
<p><i>Aboriginal Land Rights (Northern Territory) Act 1976</i> (Commonwealth)</p> <p>Administered by: Department of Social Services</p>	<p>The Act establishes the process for licensing use of Aboriginal Land, Aboriginal Land Trusts and the Land Councils to manage the Land Trusts. The Act also includes penalties for entry onto sacred sites and payments to the Land Councils for use of the land.</p>
<p><i>Aboriginal Land Act</i> (NT)</p> <p>Administered by: Department of Land Planning and the Environment</p>	<p>Authorises a Land Council to grant certain permits to access Aboriginal land but Land Councils are not able to grant permits that would interfere with the use or enjoyment of the owner of another interest, such as the section 41 Authority, granted under the Atomic Energy Act.</p>
<p><i>Northern Territory Aboriginal Sacred Sites Act</i></p> <p>Administered by: Minister for Community Services</p>	<p>Establishes a procedure for the protection and registration of sacred sites and establishes the Aboriginal Areas Protection Authority. A sacred site is defined as one that is sacred to Aboriginal people or is otherwise of significance according to Aboriginal tradition. The Act also introduces an additional definition of "custodian", which is an Aboriginal person who has responsibility under Aboriginal tradition for a sacred site. These wide definitions mean that all sacred sites are protected whether they are declared or registered or not.</p> <p>The Act establishes offences for entry onto, work on or desecration of, sacred sites without appropriate certification or in contravention of the certification.</p> <p>The Aboriginal Areas Protection Authority is established as an independent, statutory organisation under the <i>Sacred Sites Act</i> to oversee the protection of sacred sites in the NT. The Australian Aboriginal Protection Authority has power to prosecute individuals and corporations for breaching provisions of the NT Aboriginal Sacred Sites Act and power to facilitate discussions between custodians and persons proposing to do work to reach agreement about site</p>

Act/Regulation	Description
	protection; establish and maintain a Register of Sacred Sites; issue Authority Certificates allowing work to proceed on a sacred site; and, enforce the provisions of the Act.
<p data-bbox="245 436 467 468"><i>Heritage Act 2011</i> (NT)</p> <p data-bbox="245 478 500 510">Heritage Regulations 1991</p> <p data-bbox="245 520 597 583">Administered by: Department of Land Planning and the Environment</p>	<p data-bbox="662 317 1365 464">The Heritage Act protects Aboriginal archaeological objects and places. The archaeological objects covered are relics pertaining to the past occupation by Aboriginal or Macassan people, being: an artefact or thing of any material given shape to by man; a natural portable object of any material sacred according to Aboriginal tradition; or human or animal skeletal remains.</p> <p data-bbox="662 474 1365 705">The Heritage Regulations prescribe Aboriginal portable cultural objects as archaeological objects. This includes secret and ceremonial objects, log or bark coffins, human remains, portable rock or wood carvings or engravings or stone tools. Archaeological places are also prescribed by the Heritage Regulations including places containing rock paintings or rock carvings; prehistoric or proto-historic occupation places; and places containing human remains or burial artefacts (not including cemeteries within the meaning of the Cemeteries Act).</p>
<p data-bbox="245 751 613 814"><i>Protection of Movable Cultural Heritage Act 1986</i> (Commonwealth)</p> <p data-bbox="245 825 586 888">Administered by: Attorney-General's Department</p>	<p data-bbox="662 737 1349 905">For a declared heritage place or object, a conservation management plan is required for a person to carry out work of any sort, to damage, demolish, destroy, desecrate or alter or, for the object to be moved. The Heritage Conservation Regulations also require a person who discovers an archaeological place or archaeological object to advise the Director of its location, as soon as practicable.</p>
<p data-bbox="245 961 586 1056"><i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i> (Commonwealth)</p> <p data-bbox="245 1066 597 1171">Administered by: Department of the Prime Minister and Cabinet</p>	<p data-bbox="662 940 1377 1192">The <i>Aboriginal and Torres Strait Islander Heritage Protection Act</i> is designed to be a last resort for protection of both significant Aboriginal objects and areas. It allows the Commonwealth Minister for the Environment to make a declaration to protect significant Aboriginal objects and areas in certain defined circumstances. A significant Aboriginal area or object is an area of land, an area beneath territorial waters, an area of waters (either within Australia or in territorial seas) or an object which has particular significance to Aboriginals in accordance with Aboriginal tradition. A significant Aboriginal object includes Aboriginal remains.</p>

### Regulation relevant to Ranger mine's location

Act/Regulation	Description
<p data-bbox="245 1535 630 1629"><i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth) (EPBC Act)</p> <p data-bbox="245 1640 480 1671">EPBC Regulations 2000</p> <p data-bbox="245 1682 581 1745">Administered by: Department of the Environment</p>	<p data-bbox="662 1409 1373 1556">The EPBC Act provides a national scheme for environment and heritage protection and biodiversity conservation. Under the EPBC Act, actions likely to have a significant impact on Matters of National Environmental Significance (MNES) are assessed. Matters considered to be of national environmental significance include:</p> <ul data-bbox="662 1566 1097 1881" style="list-style-type: none"> <li>World Heritage values;</li> <li>National Heritage values;</li> <li>wetlands of international importance;</li> <li>threatened species and ecological communities;</li> <li>migratory species;</li> <li>the Great Barrier Reef Marine Park;</li> <li>Commonwealth marine areas; and,</li> <li>nuclear actions (including uranium mining).</li> </ul> <p data-bbox="662 1892 1341 1923">In addition to MNES (prescribed actions) that may require assessment, the</p>

Act/Regulation	Description
	<p>EPBC Act also outlines "special rules for some Commonwealth reserves", such as the permitting of mine-related transportation along routes (including air routes) prescribed by the regulations (refer EPBC Act, Chapter 5, Part 15, Division 4(G)(387)(2)(b)).</p> <p>The EPBC Regulations contain extensive prohibitions on activities within Kakadu National Park, including prohibitions on a number of activities undertaken without the Director's approval.</p>
<p><i>Environment Protection (Alligator Rivers Region) Act 1978</i> (Commonwealth)</p> <p>Administered by: Department of the Environment</p>	<p>The Environment Protection (Alligator Rivers Region) Act establishes the functions and responsibilities of the Supervising Scientist and the Environmental Research Institute of the Supervising Scientist (ERISS), as well as establishing the Alligator Rivers Region Advisory Committee and the Alligator Rivers Region Technical Committee. (Refer <b>Chapter 1, Section 1.3.6.3</b> for a description of the functions and responsibilities of these committees.)</p>
<p><i>Environmental Protection (Northern Territory Supreme Court) Act 1978</i> (Commonwealth)</p> <p>Administered by: Attorney-General's Department</p>	<p>This Act gives the Supreme Court of the NT jurisdiction to make orders for the enforcement, in relation to uranium mining operations in the Alligator Rivers Region, of any requirement that relates to the environment in that region.</p>
<p><i>Environmental Assessment Act</i> (NT)</p> <p>Administered by: Department of Land Planning and the Environment</p>	<p>This Act provides for 'the assessment of the environmental effects of development proposals and for the protection of the environment'. The NT Minister for Lands Planning and the Environment is responsible for administering the Act and determining the appropriate level of environmental assessment for the development proposal, which depends upon the sensitivity of the local environment, the scale of the proposal and its potential impact upon the environment.</p>
<p><i>Jabiru Town Development Act</i> (NT)</p> <p>Administered by: Department of Local Government and Regions</p>	<p>The Act established the Jabiru Town Development Authority, whose functions include protecting the environment in so far as it is affected by the construction and operation of the town of Jabiru. In the exercise of its powers and in performing its functions the Authority must act in accordance with the provisions of the EPBC Act.</p>

## ANNEXE C: SUMMARY OF SIGNIFICANT INCIDENTS

### Introduction

Since mining began at Ranger, environmental incidents have been reported routinely to the Supervising Authority. Following a detailed investigation of a process water leak incident at Ranger mine in 2000, which was determined not to be a breach of the Commonwealth's Environmental Requirements or Northern Territory legislation (SSD 2002), the Supervising Scientist recommended that the Minesite Technical Committee (MTC):

*"... should develop guidelines clarifying requirements for the reporting of incidents which retain the transparency of the current system, are consistent with Environmental Requirement 6.1, reduce the need for the exercise of judgement by staff of ERA and will assist in minimising undue concern for Aboriginal people and the broader community."*

ERA developed an unplanned event register which was reported to regulators, monthly. The MTC agreed with this approach and it was implemented. Later, however, in response to regulator concerns about the establishment of suitable thresholds of incident severity for incident reporting purposes, ERA chose to report all environmental incidents, no matter the level of impact, in addition to required statutory reports. In 2002, at the time of a Senate Inquiry into the Environmental Regulation of Uranium Mining, approximately 122 incidents had been reported to the MTC and investigated both by ERA and regulators (Commonwealth of Australia 2002; p 27) . While this may be perceived as a large number, this should be viewed in the context of incident severity and actual or potential environmental harm. As such, and in line with the analysis and submission by the then Supervising Scientist during the Inquiry, the number of reported events is a reflection of the rigour of the reporting framework and not a reflection on the standard of environmental performance at Ranger mine (Commonwealth of Australia 2002; p 27). Details of these incidents and the outcomes of investigations were published in the Annual Reports of the Supervising Scientist (<http://www.environment.gov.au/ssd/publications/>). None of the reported incidents at this time had resulted in a breach of the Ranger Authorisation.

The following events comprise those of highest realised or potential impact to health, safety or environment in the history of operations at Ranger mine. A brief discussion of how systems and processes have been subsequently upgraded, is also provided.

### Product Spill

On 5 July 1982, approximately one tonne of product was accidentally discharged from the bottom of the product bin during an attempt to clear a choked discharge spout in the product packaging building. This resulted in two workers being exposed to product dust as the blockage was cleared and the product fell from the bin. It was found that the two workers were not wearing respiratory protection for the full period of the event and subsequently inhaled and ingested product dust. Both workers were measured by whole body monitors as well as undergoing a series of bioassay analyses. (Supervising Scientist 1983; pp 27 & 29.)

As a result of this event and two subsequent events during the ensuing 12 month period, involving personnel inhaling radioactive dust, ERA introduced a work permit system for non-routine operations that are potentially hazardous. The permit system required provision of a detailed description of the task to be performed, including the radiological procedures to be

observed, and sign-off by the radiation safety officer. (Supervising Scientist 1983; pp 27 & 29.)

### **Diesel Spill into Retention Pond 2 (RP2)**

On 6 December 1995, between 10 m<sup>3</sup> and 12 m<sup>3</sup> of diesel spilled from tanks at the power station and ran into RP2, an on-site pond water storage facility. The diesel was recovered by absorbent mats and other methods but resulted in the death of 40 water birds. On 13 December 1995 the recovered diesel/water mixture from the previous incident was again accidentally discharged to RP2 but without environmental impact. As a result of these incidents, a training program and a "fail-safe" bund management system were introduced to ensure that such incidents did not occur in the future. In addition to these measures, the environmental consulting firm Dames and Moore was commissioned to undertake a risk management study. Recommendations made from this study were subsequently implemented. (Supervising Scientist 1996; pp 36.)

The Supervising Scientist regarded this incident as the first example of an unacceptable environmental impact at Ranger since operations began. (Supervising Scientist 1996; pp 36.)

### **Poor Quality Water in Corridor Creek Wetlands**

An incident in February 2002 involved misplacement of low grade ore on the stockpiles, contrary to an approved stockpile management plan. This led to poor quality seepage and rainfall runoff entering the Corridor Creek wetlands instead of reporting to RP2, which contains poor quality seepage and runoff waters. The incident did not constitute a breach of the Commonwealth's Environmental Requirements or the NT legislative requirements. However, the Supervising Scientist concluded that there were deficiencies in ERA's environmental management systems and he required them to be upgraded such that they were compliant with ISO 14001 by July 2003 and certified against ISO 14001 by July 2005. ERA achieved these milestones and ISO 14001 Certification was confirmed by audit in December 2003.

A new environmental auditing regime was in place by this time and included an environmental management system audit carried out each year by trained and accredited auditors from the MTC. Audit reports are submitted to the Alligator Rivers Region Technical Committee; discussed at the Alligator Rivers Region Advisory Committee meetings and are summarised in the Annual Reports of the Supervising Scientist. In addition to the audit program, Routine Periodic Inspections are conducted every month by representatives of the MTC. The Routine Periodic Inspection program is structured to assess water management issues, as well as specific focus items such as waste management, staff training, tailings dam performance, environmental monitoring and radiation protection.

### **Contractor Exposure to Product Dust**

In November 2002, while installing a new roof on the precipitator building, contractors were inadvertently exposed to uranium oxide product dust which had accumulated from fugitive emissions out of exhaust vents resulting from a blockage in a scrubber system in the adjacent calciner building.

The most exposed individual was estimated to have received a radiation dose of approximately 10 mSv,<sup>15</sup> which is significantly below the dose limit of 100 mSv permissible in five consecutive years with a maximum of 50 mSv in any one year (SSD 2003). The Supervising Scientist expressed concern that the fugitive dust had not been detected by routine monitoring of the calciner and product packing systems. Procedures were reviewed and revised to ensure that this could not happen again.

### **Contamination of the Potable Water System**

In March 2004, contamination of the potable water system with process water was noted during night shift, causing operations to halt immediately. Investigation of the incident and assessments of the impacts on the health of ERA's employees and members of the public who had frequented Jabiru East businesses at the time and the downstream environment, were completed separately by ERA, regulators, and the OSS. The Supervising Scientist concluded that the underlying cause of the incident was the condition of the process water distribution system, a condition that ERA immediately implemented a program of refurbishment. The Supervising Scientist determined that the primary risk with the incident was an occupational health and safety issue, which is not addressed under the ISO 14001 environmental management system implemented at Ranger. ERA was declared in breach of two of the Environmental Requirements, namely:

- failure to ensure that process water was contained within a closed system (ER 3.4); and
- failure to ensure that radiation doses to company employees and contractors must be kept as low as reasonably achievable (ER 5.1) (SSD 2004).

ERA was subsequently fined.

The principal conclusion of the health investigations, involving both risk assessment and medical assessment methods, was that it was most unlikely that any employees or contractors who had ingested or contacted contaminated water would suffer longer-term or delayed health effects. ERA adopted a precautionary approach and initiated a follow-up health monitoring program in consultation with affected workers and their doctors.

Detailed environmental assessments demonstrated that no change occurred in the chemistry of Magela Creek downstream of Ranger mine resulting from the incident (SSD 2004) and all 34 regulatory recommendations resulting from this incident were implemented by ERA.

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<sup>15</sup> mSv - millisievert: The sievert is the unit of absorbed radiation dose, taking into account the differing biological effects of different types of radiation.

## **Radiation Clearance**

Further significant incidents relating to two small earthmoving vehicles (bobcats) leaving Ranger mine site without adequate radiation clearance were investigated during March 2004. Concerns were for the possible impact on the health of members of the public exposed to radioactive materials contained on these vehicles (SSD 2004). Investigations by the OSS of the return of contaminated vehicles to a Community Development Employment Projects yard in Jabiru, found that a mechanic and his children were exposed to low levels of radiation from partially leached uranium ore material. They concluded that the likely radiation dose would have been less than the annual dose limit for members of the public and was not a significant health risk.

Principally resulting from the radiation protection incidents, involving radiation exposure risk to workers and members of the public, described above, the Supervising Scientist required a change in radiation protection culture at ERA. It was noted that the concentrations of radionuclides in materials at Ranger mine is relatively low in comparison with some other mines in the world. Nevertheless, the Supervising Scientist was critical of ERA's approach to radiation protection and, hence, occupational health and safety, at that time, determining that the company did not employ best practice procedures and that radiation doses received by members of the public were not as low as reasonably achievable. He also considered that the company did not have procedures in place to ensure protection of the health of members of the regional community. In this context, the Supervising Scientist considered that ERA was in breach of three of the Environmental Requirements (1, 5.1 and 12.1). The Supervising Scientist recommended that increased resources and a change in culture be implemented, arguing that ERA had not employed an adequate number of appropriately qualified and experienced staff to ensure that it could provide the required level of protection of human health (possibly in breach of Environmental Requirement 14.1). ERA was subsequently fined. ERA accepted the criticism and worked systematically for certification against the Australian Safety Standard AS 4801, achieving this in September 2005.

## **Acid Truck Incident**

On the evening of 1 January 2009, a Chemtrans truck carrying 17,000 litres of sulfuric acid to the Ranger mine was involved in a single vehicle accident on the Arnhem Highway approximately 20 km from the Stuart Highway turn-off. The driver of the truck had swerved to miss a vehicle towing a trailer that had crossed the middle line and was travelling on the right hand side of the road towards the truck. The driver managed to keep the prime mover and two of the three trailers on the road but the third and final trailer rolled.

As a result approximately 6,000 litres of acid was released to an area approximately 40 m - 50 m long by 3 m wide. The acid release was contained within the scene of the accident by placing bunds around the release and potash on the acid.

At the time of the incident, NT EPA indicated that there was no threat to wetlands in Kakadu National Park and Fogg Dam Conservation Reserve.

The driver was unharmed and commended by the NT EPA for his swift and appropriate action to contain the acid release immediately after the incident. The release was treated insitu and the site was monitored by the NT EPA and Chemtrans.

## Leach Tank Failure

At approximately 1:00 am on 7 December 2013, a hole was discovered in the side of leach tank 1 located within the processing area. Personnel were removed from the nearby area prior to the tank rupture and loss of about 1 Mt of slurry<sup>16</sup> material, into the onsite containment systems. Whilst some slurry from the leach tank was released from the processing area, the multiple level containment systems installed at Ranger mine to manage these types of events ensured the slurry material was fully contained onsite and prevented any impact on Kakadu National Park or ERA employees.

The radioactivity of the slurry was low and well within levels that are not harmful to humans. No material escaped into the Kakadu National Park and ongoing monitoring has confirmed that there has been no impact on Kakadu National Park. There were no injuries to our employees or contractors as a result of the leach tank failure.

ERA voluntarily suspended its operations and, also, received notification from the NT Department of Mines and Energy and the Commonwealth Minister for Industry to suspend processing and not to recommence without the regulatory approval. Subsequently, ERA commissioned independent investigations to assess why the leach tank failed and to review the structural integrity of the processing plant. ERA has confirmed that the work to dismantle and remove the leach tank 1 and its associated infrastructure from the processing plant is complete.

These investigations were led by independent experts with experience in major incident investigation and asset integrity and maintenance, respectively, and are now complete. The key findings of the investigation were made public on 27 March 2014 (refer [http://www.energyres.com.au/media/38\\_media\\_releases\\_3084.asp](http://www.energyres.com.au/media/38_media_releases_3084.asp)) and are outlined below:

- The root cause investigation found that the rubber lining inside leach tank 1, which protects the tank from corrosion, had been damaged by a baffle plate which had partially failed inside the tank.
- The damaged rubber lining allowed acidic slurry mixture to come into contact with the tank's steel wall. The acid corroded the steel and this led to the failure of the tank.
- In 2009, leach tank 1 was modified to include a high powered agitator to process laterite ore, when it had previously processed primary ore. The investigation has found that the partial failure of the baffle was most likely attributable to these modifications.

As a result of these findings, the six other leach tanks on site have been emptied and inspected. The inspections identified some metal fatigue in the baffle supports in leach tank 6, resulting in the redesign and replacement of baffle supports in all leach tanks.

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<sup>16</sup> Slurry is a mixture of ore and sulfuric acid.

Concurrent with ERA's investigation, a Government taskforce was appointed to oversee the regulatory response to the incident. This included an extensive investigation of the leach tank circuit and other critical infrastructure undertaken by Noetic Risk Solution and HRL Technology on behalf of the Commonwealth Department of Industry and the NT Department of Mines and Energy. Based on the outcome of the investigation, ERA was given Commonwealth and NT government approval on 5 June 2014 for the staged restart of the Ranger mine processing plant. The 10 findings and three recommendations by Noetic Risk Solution and HRL Technology are available at:

<http://www.industry.gov.au/resource/Mining/AustralianMineralCommodities/Uranium/Pages/FindingandRecommendationsRangerRestartCapabilityReportbyIndependentExperts.aspx>

Subsequent to outcomes of the above investigations, the final report by the Supervising Scientist on the impacts of the leach tank failure were released on 28 August 2014. The report details the outcomes of the investigations into all potential avenues for environmental impact and extensive tests of air, soil and water in both the creeks and the ground around the mine site. The report presents all the environmental test results and confirms all the findings of an interim report which was released in July 2014. It is the conclusion of the Supervising Scientist that the leach tank failure has not resulted in any adverse impacts to human health or the surrounding environment, including Kakadu National Park. The final report is available at:

<http://www.environment.gov.au/science/ssd/publications/ssr/investigation-environmental-impacts-leach-tank-failure-ranger-uranium-mine-december-2013>.