



Chapter 15
Environmental management framework

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15 ENVIRONMENTAL MANAGEMENT FRAMEWORK

15.1 INTRODUCTION

Open cut mining at Ranger ceased in November 2012. The Ranger 3 Deeps underground mine (the Project) will enable the continuation of uranium mining at Ranger. While the proposed method of mining varies from historical practices (e.g. open cut) many supporting activities remain the same such as stockpiling, water management, waste management, ore processing and product packaging.

Environmental aspects are managed at Ranger mine in accordance with the operation's ISO 14001:2004 and AS4801 certified health safety and environmental management system. The system has been rigorously reviewed and amended over time to become the comprehensive and streamlined system it is today. Commensurate with this, the ERA health safety and environmental management system would continue to be used should the Project be approved and progressed.

To address the EIS guidelines an environmental management plan (EMP) for the Project has been developed (refer **Appendix 17**) to describe the Project-specific commitments which would be fully integrated in the site's existing environmental management system. These commitments have been documented in the form of action plans for each relevant environmental aspect. Should the Project be approved and progressed each action plan will be integrated into the relevant exiting ERA management plan and therefore become part of the overall ERA environmental management system.

This chapter provides an overview of the environmental management system and identifies those areas of the system that would be amended to include the new treatments (commitments) to address the potential incremental risks associated with the Project. It outlines the process and environmental management documentation required for ensuring that the Draft EIS commitments, management measures and monitoring requirements are implemented at the appropriate time throughout the Project. A critical component of the EMP will be integrating activities associated with constructing and operating the underground mine with existing monitoring, management and reporting procedures that are well-established within the overall environmental management system at Ranger mine.

The commitments outlined in the Commitments Table (**Appendix 18**) are derived from the Project risk assessment and discussed in the respective Chapters/Appendices. These are carried into **Appendix 17 Environmental Management Plan** which should be read in conjunction with this chapter to obtain a full appreciation of the management measures considered.

15.2 ERA HEALTH AND SAFETY, ENVIRONMENT AND RADIATION POLICIES

ERA's policies recognise that health and safety, environment and radiation management is core to business requirements and are used as a basis to establish business objectives and targets. Each policy is reviewed annually to ensure it provides direction for the business. Final approval lies with the company's Chief Executive.

Copies of the policies are available electronically on the ERA website: http://www.energyres.com.au/index_ourapproach.asp.

ERA's Environment Policy has been developed in accordance with the global Rio Tinto health safety and environment management system – Element 1 Policy. The policy's goal is to ensure that environmental harm resulting from ERA's activities is minimised and does not compromise future land uses. The policy is a statement of ERA's intentions and principles in relation to overall environmental performance, which provides a framework for action and the setting of annual environmental objectives, targets and improvement plans. The Environment Policy reflects commitments to maintain an environmental management system certified to the ISO 14001¹ set of standards, ensure that hazards are identified and managed, and communicate the policy to all employees, contractors and persons working on behalf of the organisation.

ERA's Health and Safety Policy is a statement of ERA's intentions and principles in relation to its overall health and safety performance, which provides a framework for action and the setting of annual safety and health objectives, targets and improvement plans. The Health and Safety Policy reflects commitments to maintain a health and safety management system certified to the AS 4801² standard, eliminate all injury and illness in the operation, and improve management of activities that are identified as causing actual or potential harm to personnel.

ERA's Radiation Policy has been developed to communicate ERA's overall commitment to keeping radiation doses to workers as low as reasonably achievable. The policy provides guiding principles concerning the implementation of radiation protection strategies and continual improvement in the radiation protection program.

The ERA health, safety and environment policies will be adopted by the Project to ensure that ERA standards are upheld across all mining and processing activities.

¹ ISO 14001 is a set of standards for organisations to design and implement an effective environmental management system. It sets out criteria for an environmental management system which can then be audited and certified.

² AS/NZS 4801 is the Australian and New Zealand set of standards for effective occupational health and safety management systems. It specifies requirements for the system to enable organisational certification to set criteria.

15.3 ENVIRONMENTAL MANAGEMENT FRAMEWORK

ERA established an overall environmental management approach at Ranger mine from an early stage and this has evolved over 30 years of changing environmental management practices, technology and experience. ERA's health safety and environmental management system has been certified against ISO 14001 in December 2003 and Australian safety standard AS 4801 in September 2005 and has since maintained this accreditation. These standards provide for consistent performance markers and allow ERA to self-assess compliance which can then be verified by regulators, stakeholders and the general public. The ERA health, safety and environment management system aligns with the *Rio Tinto Management System Standard*, and specifically addresses each of the 17 elements shown in **Figure 15-1**.

Rather than having a single overarching environmental management plan, ERA has developed and regularly reviews a series of environmental management plans in accordance with the Rio Tinto Health Safety and Environmental Performance Standards. These plans are comprehensive and specific to each environmental aspect e.g. water, land use, air quality.



Figure 15-1: Health, safety and environment management system elements

The ERA health, safety and environmental management system is further supported by the strategic policies and guidance notes contained within the global Rio Tinto management system.

All EMPs fall under element 10 operational control of the ERA health, safety, environment and management system. To supplement the Draft EIS, ERA has uploaded key existing environmental management plans, relevant to the Project, to the ERA website www.energyres.com.au.

15.3.1 Integration of the Project

The Project EMP carries forward commitments (new treatments) identified during the Project risk assessment along with objectives and performance indicators as a series of action plans which require implementation through the management system (refer **Appendix 17**). Should the Project be approved and progressed, each action plan will be integrated into the relevant existing ERA management plan and therefore become part of the overall ERA environmental management system.

15.4 MITIGATION MEASURES AND COMMITMENTS

The risk assessment initially considered controls (mitigation measures) that are implemented as part of existing operations and can be extended and incorporated into the Project's design and implementation. New treatments (controls) were then identified and factored into the assessment of consequence, in some cases this resulted in a revised risk ranking. These additional treatments, and those identified in technical studies that have been completed since the risk assessment, form the basis for a number of commitments.

These commitments (requiring ongoing management to achieve implementation) have been compiled, and are detailed in **Appendix 17**. Their intent is to further explain how the additional treatments will be implemented to mitigate or minimise impacts and improve environmental outcomes. The commitments can be generally categorised into those that are inherent in the design of the Project (its infrastructure or primary operating methods, as described in **Chapter 3, Section 3.5**) and those that will require ongoing implementation through management systems as described in **Appendix 17**. The design commitments are discussed throughout **Chapter 3** and itemised in **Appendix 18**. The commitments requiring ongoing implementation have been presented in the Project phases of the construction, operation, and decommissioning.

15.4.1 Targets and Objectives

ERA has developed objectives and targets for the existing mine which are reviewed annually as part of the business planning process. The overarching objectives of the Project EMP are to:

- Demonstrate how the impact of underground mining activities on the environment will be minimised through identifying new treatments; and
- Identify how compliance with regulatory and ERA policy requirements will be achieved.

Specific objectives and targets have been identified for each environmental issue and are described in the action plans (**Appendix 17, Section 5.1**)

15.4.2 Contingencies

In the event an environmental incident is observed, the person who first encounters the incident is responsible for taking immediate action as required, to contain, clean up and report the incident. Where there is threat to the environment, people or property, the person who discovers the incident is responsible for notifying the ERA Emergency Services Officer at the Ranger mine gatehouse. The manager responsible for environment³ will be contacted in the event of an environmental emergency and will attend if required. Reporting of environmental incidents will be in accordance with **Section 15.4.5**.

Emergency preparedness and response is discussed in more detail in **Appendix 17, Section 5.2**.

15.4.3 Performance Indicators

Performance is measured at ERA in a number of ways, e.g. audits, on the job safety interactions with employees, inspections, recording incidents and implementation of both preventative and corrective actions. This is captured within ERA's management system standards. These actions are assigned to personnel and are tracked and reviewed regularly, e.g. the requirement for personnel to complete a certain number of health, safety and environment interactions per month and ensuring that monthly housekeeping inspections are completed by responsible departments. Results are captured in the Rio Tinto Business Solution which is an internal Rio Tinto information sharing and systems management website. Incident actions are reviewed by management each quarter to ensure completion and close out.

15.4.4 Measuring and Monitoring

The Project is predominantly based within the existing operational footprint of the Ranger mine site, adjacent to Pit 3.⁴ Intensive baseline and operational environmental monitoring has been and is currently undertaken at ERA with data compiled over the previous 30 years. This data has been reported annually to the NT Government via the ERA Mining Management Plan and other statutory reports (refer **Chapter 8**). More recently this monitoring was expanded to capture potential risks from the exploration decline activities. This extensive monitoring data forms a strong basis for modelling and studies conducted for this EIS.

The NT Department of Mines and Energy undertakes surface water check monitoring at selected sites around the Ranger project area. The primary objectives of the monitoring are to assess (DoR 2012) the adequacy of monitoring data being collected by ERA, and the potential influences of the mine site on downstream water quality. This information is further discussed in **Chapter 8**.

³ Presently Manager, Health, Safety, Environment and Water.

⁴ There may be a small area of clearance in previously disturbed areas immediately adjacent to the "operational area".

The Environmental Research Institute of the Supervising Scientist (ERISS) also undertakes independent environmental monitoring to detect any impacts upon ecosystems and humans arising from operational activities at Ranger mine and Jabiluka (**Chapter 8**).

Additional measuring and monitoring programs proposed are specified for each environmental issue in the action plans (refer **Appendix 17, Section 5.1**). A summary of this information has been provided in Table 15-1.

Table 15-1: Additional measuring and monitoring programs proposed

Additional measuring and monitoring for the Project	Chapter cross reference
<i>Air, noise and vibration emissions (including cultural heritage)</i>	
Dust deposition monitoring will occur at the R34 cultural heritage site to validate the predictions of air quality modelling which indicate very low levels of incremental impact. Dust suppression will be undertaken on all earthen areas.	Section 10.4.2.2
Nitrogen dioxide monitoring will be undertaken at nearest residential receptor (Ranger mine village contractor camp) until such time as the air modelling outcomes are validated.	Section 6.4.6
Surface vibration monitoring will be undertaken at culturally significant locations in the first 12 months of mine development to validate predicted vibration identified in the vibration impact assessment.	Section 10.4.2.3
<i>Occupational health and safety</i>	
Brines from Pit 3 may interact with backfilled stopes and degrade structural integrity. When mining is occurring adjacent to paste fill, it will be inspected for structural integrity.	Section 7.3.1
Continuous ventilation monitoring stations will be installed in underground work areas to confirm that air quality is acceptable.	Section 7.3.1
<i>Radiation protection</i>	
Personal and area monitoring programs will be implemented for radon decay products, gamma radiation and radioactive materials in dust.	Section 7.4.3
Underground workers occupying high gamma exposure areas will be monitored using an electronic personal monitor	Section 7.4.2
<i>Water</i>	
Existing surface and ground water monitoring programs undertaken at Ranger mine are considered sufficient to ensure protection of downstream ecosystems.	
<i>Flora and fauna</i>	
Existing strategies and controls identified for monitoring for the Project are considered sufficient to ensure impact on flora, fauna and appropriate land use stewardship is minimised.	
<i>Rehabilitation and closure</i>	
The rehabilitation monitoring program for Ranger mine current operations closure is currently being developed with the closure criteria in consultation with stakeholders. These closure criteria and associated monitoring program will also apply to the Project.	

15.4.5 Reporting Protocols

15.4.5.1 Continual Improvement

The ERA environmental management system is audited and reviewed internally and externally through:

- scheduled internal self-assessment audits;
- scheduled corporate audits; and
- external certification auditing of the systems by the company that issues the ISO 14001 and AS 4801 certification.

The commitments and environmental requirements resulting from the Draft EIS assessment process for the Project will be incorporated into the environmental management system and audited as part of the existing process of scheduled internal and external audits described above and detailed in **Appendix 17**.

15.4.5.2 Non-conformance, Incidents and Corrective Actions

In accordance with the ERA health, safety and environment management standards, incidents and near misses are reported, investigated, analysed and documented. Information collated from the investigation is analysed to identify root causes and contributing factors to ensure appropriate controls can be implemented.

Incidents are reported in a Rio Tinto wide incident reporting and action management computerised system. Regulatory non-compliances or breaches are recorded as incidents and reported where required to NT Worksafe, the Department of Mines and Energy and/or Mine Site Technical Committee (MTC).⁵

A significant incident is an incident with an actual consequence of serious, major or catastrophic or where the maximum reasonable outcome is high or critical. Significant incidents are also reported into the Rio Tinto social environment, and reporting tool to share the lessons learned with other Rio Tinto businesses. Classification of the incidents in terms of actual consequence and maximum reasonable outcome are to be undertaken in accordance with the ERA risk standards and procedures. The incident classification determines the extent of the investigation required and the notification required. This includes notifying parties both internal and external to the business and Rio Tinto. All Incidents (including near misses) must be investigated to a level of detail appropriate to the maximum reasonable outcome of the incident. Significant incidents are investigated using the full Taproot® process, excluding those incidents which result in restricted workday injuries and illnesses (these may be analysed using a method chosen at the discretion of the relevant manager).

⁵ The Ranger Minesite Technical Committee (MTC) is the body set up to provide advice on the regulation of Ranger mine to the NT Minister for Mines and Energy. This committee comprises representatives of the Northern Territory Department of Mines and Energy (Chair), Supervising Scientist Division (SSD), ERA, Gundjeihmi Aboriginal Corporation (GAC) and the Northern Land Council (NLC).

⁶ Taproot is an incident investigation method which aims to identify all relevant actions and circumstances, and clearly establishes causal factors and effective corrective actions.

Additional details of reporting requirements are summarised below.

Internal and external reporting

ERA has a number of existing requirements regarding the external reporting of environmental aspects. Should the Project be approved and progressed reporting requirements applicable to ERA will apply to and include the Project's contribution. ERA's external environmental reporting requirements are discussed in the ensuing paragraphs:

National Pollutant Inventory: ERA estimates and reports Ranger mine emissions (when usage exceeds the identified threshold for any of the 93 government specified substances) directly to the state or territory environmental agency annually. This data is then submitted by the state or territory to the Commonwealth agency.

National Greenhouse Environment Reporting: Under the *National Greenhouse and Energy Reporting Act 2007*, ERA estimates and reports Ranger mine greenhouse gas emissions, energy consumption and production, as required, to the Australian Government.

Mining Management Plan Reporting: ERA must report on specific environmental aspects (e.g. environmental incidents, monitoring and closure planning activities) to the NT Department of Mines and Energy for each 12 month period. This report includes environmental incident reporting, targets, monitoring and measurement and closure planning

Ranger Authorisation: The Ranger Authorisation is established under the NT *Mining Management Act*.⁷ The Ranger Authorisation requires reporting of specific environmental aspects on a regular basis, as further discussed in **Appendix 17, Section 6**. This reporting requirement is also required under Environmental Requirements which attach to the Section 41 Authority of the Commonwealth *Atomic Energy Act 1953*⁸ and *Environment Protection (Alligator Rivers Region) Act 1978*⁹.

Rio Tinto Social Environment Reporting: Rio Tinto collects social and environment data on an annual basis to support its internal and external reporting of performance and risks in the health, safety, environment, greenhouse, community and product stewardship areas. Much of the health, safety, environment and community data used for reporting are collected using the Rio Tinto Social and Environmental Assurance Reporting Tool, which is an internal web-based system. Data collected in the survey is reported internally and externally as described further in **Appendix 17, Section 6.2**.

15.5 HAZARD IDENTIFICATION AND RISK MANAGEMENT

The purpose of hazard identification and risk management is to ensure that health, safety and environmental hazards, aspects and opportunities are identified, and their resulting risks to people, property, assets and the environment evaluated, managed, and recorded in a common register.

⁷ Refer Part 4, Division 1, Section 34 of the *Mining Management Act 2001*. The Mining Management Act No. 43, commenced on January 2002, repealing the *Uranium Mining (Environment Control) Act 1993* under which the Ranger Authorisation was originally established.

⁸ Refer Part III The Ranger Project of the *Atomic Energy Act 1953*.

⁹ Refer Section 3(1) prescribed instrument (b) (ii) of the *Environment Protection (Alligator Rivers Region) Act 1978*.

ERA has identified controls around existing environmental risks on the RPA (in a risk register). This risk register is reviewed and updated annually or when new information becomes available to ensure that new risks are captured and controlled. While the Project proposes a new method for ore extraction, it will use existing facilities and resources to stockpile, process and manage the product and any wastes. Commensurate with this, many risks identified for the Project will be controlled through existing infrastructure, treatments and management practices. New or altered risks and additional controls associated with the Project identified through the risk assessment are outlined herein. Should the Project be approved, these new risks and controls will be integrated into the existing ERA Ranger mine risk register and environmental management plans.

The risk assessment process included a week-long workshop with key technical experts during the week 9 – 13 December 2013. The assessment identified the potential environmental risks arising from the Project, including strategies for minimising potential impacts. The collated analysis was subsequently reviewed and re-evaluated following further Project planning in 2014.

The selection of controls drew on the experience of the relevant technical experts and involved the application of two governing principles:

- The as low as reasonably practicable (ALARP) principle; and
- The hierarchy of control:
 - Elimination, e.g. controlling the hazard at source or eliminating the possibility of the risk event.
 - Substitution, e.g. replacing one substance or activity with a less hazardous one.
 - Engineering, e.g. secondary and tertiary containment
 - Administration, e.g. policies and procedures for safe work practices.

A balance was reached between these two governing principles during the risk assessment as controls were formulated. While elimination and substitution are the preferred controls, these are not always possible and hence assessing the full hierarchy of controls was required. Other considerations include:

- legislative and regulatory requirements;
- ERA's health, safety and environment management system;
- Rio Tinto standards, in particular the Health Safety Environment Performance Standard – Environment;
- Australian standards;
- stakeholder expectations; and
- accepted industry practices as provided by those with experience and expertise in the relevant area.

A number of ERA's existing environmental management plans will be amended to include the new treatments (commitments) should the Project be approved and progressed. These existing environmental management plans are considered reference documents and can be viewed on the ERA website:

- Air Quality Control Management Plan;
- Noise and Vibration Management Plan
- Ranger 3 Deeps Exploration Decline Radiation Management Plan;
- Ranger 3 Deeps Exploration Decline Water Management Plan; and
- Land Use Stewardship Summary.

A comprehensive list of new treatments arising from the Project risk assessment is detailed in **Appendix 17, Section 5.1**. Project targets and objectives for the relevant environmental aspects have been detailed in **Appendix 17, Section 5.1**.

Risks and controls associated with social aspects of the Project have been considered by the social impact assessment and are documented within the associated Social Impact Management Plan (refer **Appendix 15**).

15.6 ENVIRONMENTAL MANAGEMENT PLAN

As previously outlined, ERA has developed and implemented a number of environmental management plans to manage environmental impacts associated with the Ranger mine since the commencement of operations. These plans have been based on statutory requirements, corporate requirements and the evaluation of environmental aspects and impacts. The plans describe the affected environmental values, the potential impacts on environmental values and mitigation strategies to minimise identified potential impacts.

Commensurate with the EIS guidelines, an EMP has been developed for the Project (**Appendix 17**). This EMP collates the commitments in a series of action plans (**Appendix 17, Section 5.1**). These action plans contains cross references to the text of the Draft EIS and also identifies relevant performance indicators. The time frames for implementation of these commitments are discussed in **Appendix 17, Section 4.1.1**. Moving forward relevant action plans will be integrated into the existing relevant ERA management plans to ensure consistent environmental management practices across the entire site.

15.6.1 Review and Auditing

Internal health, safety and environment audits are undertaken in accordance with the ERA standards. A schedule of internal and external audits has been developed in the health safety and environment business solution, and implemented to cover all areas of the ERA operation. ERA maintains the AS 4801 *Occupational Health and Safety Standard Certification* and the ISO 14001 *Environmental Management Standard Certification*. All personnel who participate in health, safety and environment audits are appropriately trained and competent.

ERA's health, safety and environment conformance audit findings are documented and remedial actions planned and implemented. Actions are tracked to completion in the health safety and environment business solution and results of the ERA's conformance audits included in the Rio Tinto Social and Environment Report.

Should the Project be approved and progressed, the commitments identified in the Project EMP and other relevant recommendations from the environmental assessment process will be reviewed and integrated into the existing ERA environmental management plans. These new treatments will then be captured within the existing environmental audit schedule. These new treatments, monitoring programs and reporting requirements will need to be implemented with sufficient evidence to ensure continued certification of the environmental management system under the ISO 14001 requirements. Ongoing review of these commitments will be completed as part of the existing environmental management system.

15.6.2 Organisational Resources, Accountabilities and Responsibilities

Health, safety and environmental responsibilities are allocated based on roles with accountability for the maintenance and continual improvement of the management system established at every level of the business. These accountabilities and responsibilities are documented in role descriptions where specific responsibilities for the management of significant health, safety and environmental risk controls are established. Responsibilities are also incorporated into health, safety and environment management system.

The Manager - Health Safety and Environment has been appointed custodian of the certified management systems.

The health, safety and environment team provide support to the operating departments. Their responsibilities include:

- identifying opportunities for improved health, safety and environmental performance; attending the appropriate monthly committee meeting;
- communicating new developments or procedures to their respective department; participating in internal health, safety and environmental audits; and
- voicing any health, safety and environmental concerns departmental employees may have.

The Water and Tailings and Health, Safety and Environment departments provide technical advice to ERA staff on specific health, safety and environmental matters and implement the occupational health and safety management system and environmental management system onsite.

Health, safety and environmental operating and capital resourcing, including financial resources required for organisational infrastructure, is aligned with the organisation's annual business planning process. Adequate financial, human, technological and organisational resources have been allocated to ensure the health, safety and environment system is maintained in accordance with relevant standards and certifications.

The current operational management structure at Ranger mine is shown in **Figure 15-2**. Should the Project be approved the Project will be managed according to the existing ERA management structure.



Figure 15-2: Ranger mine management structure

To mitigate risks to the business, ERA engages specialist environment resources to support permits, approvals and licences, baseline environmental monitoring and remediation of contamination where required and deemed necessary.

Works contractors provide competent resources to manage environment and compliance risks associated with their construction activities. Contractors are required to meet the ERA health, safety and environmental management system.

15.6.3 Legal and other Requirements

The legislation, regulations and guidelines applicable to Ranger mine, in addition to Ranger mine approvals are discussed in **Chapter 1, Section 1.3.4**. A summary of applicable legislation for environmental management is provided in **Appendix 17, Section 2**.

ERA has a compliance register which has been established, implemented and maintained to identify and record all compliance, conformance and other legal obligations imposed by relevant environment, safety and health legislation.

ERA has an existing standard and work instruction that addresses the identification of legal requirements, the maintenance of legal information, and the means by which employees seek legal information. These documents will be applied to the Project should it be approved and progressed.

15.7 SUMMARY

ERA has in operation, a mature health safety and environmental management system. This consists of a number of elements including an occupational health and safety system and an environmental management system. Embedded in these systems are specific standards, management plans, standard operating procedures, work instructions, check sheets, permits and forms. This system is designed to cover all activities undertaken at Ranger mine and has effectively maintained accreditation with ISO 14001 and AS 4801 since the initial certification.

A rigorous risk assessment was undertaken as part of the pre-feasibility study to evaluate the risks of the Project with ERA's current controls and to determine which risks may require additional controls (new treatments). Where new treatments were identified they were then factored into the risk assessment which in some cases revised the risk ranking. These new treatments have now been factored into the environmental design or identified for implementation through the existing health, safety and environmental management system.

To ensure the new treatments are implemented at Ranger mine, ERA has taken the approach of developing a Project EMP to clearly capture all of these new treatments which require ongoing management. An action plan has been developed for each health, safety and environmental aspect which includes objectives and targets, new treatments for each project phase, new measuring and monitoring programs and relevant performance indicators.

Should the Project be approved and progressed these action plans will be integrated into the existing ERA health, safety and environmental management system. Many elements of the existing ERA health, safety and environmental management system will need to be amended to include the Project risks and new treatments. A number of existing environmental management plans which will need to be amended to include the new treatments are available on the ERA website to assist in the assessment of this Draft EIS. This information is explained in further detail in the Project EMP (refer **Appendix 17**).

15.8 REFERENCES

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