



## 6 Post-mining land use and closure objectives



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Cover photograph: Wasp nest (*Polistes* sp.) on Scarlet Gum (*Eucalyptus phoenicea*) on Trial Landform



## 6 POST-MINING LAND USE AND CLOSURE OBJECTIVES

### 6.1 Post-mining land use

The post-mining land uses need to be clearly articulated to allow the development of specific closure objectives, which are used in the development and formalisation of closure criteria (Section 8). In accordance with industry guidance (DMP & EPA 2015), the proposed post-mining land use(s) should be:

- relevant to the wider regional environment
- achievable in the context of post-mining land capability
- acceptable to key Energy Resources of Australia (ERA) stakeholders, and
- ecologically sustainable in the context of the local and regional environment.

The Environmental Requirements (ERs), conditions of the section 41 Authority issued under the *Atomic Energy Act 1953* and appended to the Ranger Authorisation (as Annex A) issued under the *Mining Management Act 2018 (NT)* (Section 3.1.3) specify that the Ranger Project Area (RPA) must be rehabilitated *to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park*. It should be noted that any decision on the actual incorporation of the RPA to Kakadu National Park (Kakadu NP) will be made by the relevant authority and may not eventuate until sometime after closure, if at all.

Thus, the pre-determined post-mining land use of the rehabilitated RPA is the “potential incorporation into the Kakadu NP”. To meet this land use, the closure of the Ranger Mine is required to fulfil a number of closure objectives, which are discussed below (Section 6.2).

Whether the RPA is incorporated into Kakadu NP, or not, the rehabilitated site will most likely be utilised for both recreational and cultural use by the local Aboriginal people. ERA has a long history of stakeholder engagement with the Mirarr people through consultation with the Northern Land Council (NLC) and Gundjeihmi Aboriginal Corporation (GAC). In 2014, ERA formalised this engagement regarding post-mining land use and closure criteria development with extensive consultation with Traditional Owners regarding their planned use of the site which resulted in the Garde report (2015).

Based on the outcomes of the consultations and associated report (Garde 2015) ERA developed a post closure land use document to assist in understanding the future land use and occupancy by the Mirarr and to support the assessment of post closure risks (Paulka 2016). A summary of this information is provided in this chapter.

The consultation indicated that the Mirarr are likely to return to the area for:

- customary harvesting of bush foods and medicine
- recreation
- land management activities, and
- cultural site visitation and ritual responsibilities.

Bush food and medicine collecting day trips are likely to involve fishing in Magela Creek, and may also include hunting of macropods, pigs, buffalo, water fowl (mostly magpie geese) and emus. In addition to day trips, extended seasonal camps are likely to be more common when the concentration of food resources (such as the late dry/early wet season increase in water fowl) would attract the Mirarr from beyond Jabiru to places including Georgetown Billabong, Coonjimba Billabong and the rehabilitated RP1 area and Magela Creek.

Recreational use of the RPA, including rehabilitated sites, may include:

- intergenerational knowledge transfer visits
- residential college and school trips
- camping trips along Magela Creek and other billabongs
- bushwalking trips along traditional walking routes, and
- weekend swimming and picnics.

Some of the consulted Aboriginal people indicated that a familiarisation of young people with certain cultural sites on the RPA post-rehabilitation would be desirable (Garde 2015). This could be facilitated via an organisation such as the GAC or by private trips.

On the basis of the Ranger Authorisation and feedback from the Traditional Owners the nominated post-mining land uses of the RPA are as presented in Table 6-1.

Table 6-1: Post-mining land uses

#	LAND USE OF THE REHABILITATED RANGER PROJECT AREA
1	The potential incorporation into the Kakadu National Park (Kakadu NP).
2	Cultural use of the area by the Mirarr.
3	Recreational use of the area by Aboriginal people and other community members

## 6.2 Closure objectives

Closure objectives set out the long term goals for closure and should be based on the post-mining land form and use (DIIS 2016). Closure objectives are an essential component of the rehabilitation process, providing transparency, as to what the proponent commits to achieve at closure, for stakeholders during the process of Authorisation relinquishment. Development of closure objectives should consider each of the environmental factors impacted by the operation (DMP EPA 2015).

The environmental obligations, termed Environmental Requirements (ERs) (Section 1.2.2), of the section 41 Authority, issued under the *Atomic Energy Act* and now annexed to the Ranger Authorisation issued under the *Mining Management Act* (Section 3.1.3) also provide specific closure objectives, which align to the post-closure land uses already discussed. A table of these ERs as closure objectives is provided in Table 6-2. These objectives were developed at the time of mining authorisation with the post-mining land use in mind, and have been reviewed

with stakeholders (Section 5) throughout the project and agreed as being appropriate for the project impacts and proposed land uses.

The Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015) provides a planning framework for mine closure. The framework is similarly reflected in other industry guidance documents (AusIMM 2018) and details the process for collating project details, stakeholder input, baseline environmental information, risk and uncertainties to determine appropriate post-mining land use(s) and closure objectives. Closure objectives require the development of relevant and measurable criteria, to demonstrate and determine when the objectives and successful rehabilitation have been achieved. Section 8 presents the current status of closure criteria, as informed by the project impacts, supporting studies and stakeholder engagement.

Table 6-2: Closure objectives

Objective	ER reference
<b>Landform</b>	
The tailings are physically isolated from the environment for at least 10,000 years.	11.3 (i)
Erosion characteristics which, as far as can reasonably be achieved, do not vary significantly from comparable landforms in surrounding undisturbed areas.	2.2 (c)
<b>Radiation</b>	
Stable radiological conditions on areas impacted by mining so that, the health risk to members of the public, including Traditional Owners, is as low as reasonably achievable; members of the public do not receive a radiation dose which exceeds applicable limits recommended by the most recently published and relevant Australian standards, codes of practice and guidelines; and there is a minimum of restrictions on the use of the area.	2.2 (b) and 11.3 (iii)
In particular, the company must ensure that operations at Ranger do not result in: <ul style="list-style-type: none"> <li>• change to biodiversity, or impairment of ecosystem health*, outside of the Ranger Project Area. Such change is to be different and detrimental from that expected from natural biophysical or biological processes operating in the Alligator Rivers Region; and</li> <li>• environmental impacts within the Ranger Project Area which are not as low as reasonably achievable, during mining excavation, mineral processing and subsequently during and after rehabilitation.</li> </ul>	1.2 (d, e)



**ERA**



Objective	ER reference
<b>Water and sediment</b>	
<p>The company must not allow either surface or ground waters arising or discharged from the Ranger Project Area during its operation, or during or following rehabilitation, to compromise the achievement of the primary environmental objectives.</p> <p>The company must ensure that operations at Ranger are undertaken in such a way as to be consistent with the following primary environmental objectives:</p> <p style="padding-left: 40px;">Protect the health of Aboriginals and other members of the regional community.</p> <p>The company must ensure that operations at Ranger do not result in:</p> <p style="padding-left: 40px;">An adverse effect on the health of Aboriginals and other members of the regional community by ensuring that exposure to radiation and chemical pollutants is as low as reasonably achievable and conforms with relevant Australian law, and in particular, in relation to radiological exposure, complies with the most recently published and relevant Australian standards, codes of practice and guidelines.</p>	3.1, 1.1(c) and 1.2(c)
<p>The company must not allow either surface or ground waters arising or discharged from the Ranger Project Area during its operation, or during or following rehabilitation, to compromise the achievement of the primary environmental objectives.</p> <p>The company must ensure that operations at Ranger do not result in:</p> <p style="padding-left: 40px;">Change to biodiversity, or impairment of ecosystem health*, outside of the Ranger Project Area. Such change is to be different and detrimental from that expected from natural biophysical or biological processes operating in the Alligator Rivers Region.</p> <p>Final disposal of tailings must be undertaken, to the satisfaction of the Minister with the advice of the Supervising Scientist on the basis of best available modelling, in such a way as to ensure that:</p> <p style="padding-left: 40px;">any contaminants arising from the tailings will not result in any detrimental environmental impacts for at least 10,000 years.</p>	3.1, 1.2(d) and 11.3 (ii)
<p>The company must not allow either surface or ground waters arising or discharged from the Ranger Project Area during its operation, or during or following rehabilitation, to compromise the achievement of the primary environmental objectives.</p> <p>The company must ensure that operations at Ranger do not result in:</p> <p style="padding-left: 40px;">environmental impacts within the Ranger Project Area which are not as low as reasonably achievable, during mining excavation, mineral processing, and subsequently during and after rehabilitation.</p>	3.1 and 1.2(e)
<b>Flora and fauna</b>	
<p>Revegetation of the disturbed sites of the Ranger Project Area using local native plant species similar in density and abundance to those existing in adjacent areas of Kakadu NP, to form an ecosystem the long-term viability of which would not require a maintenance regime significantly different from that appropriate to adjacent areas of the park.</p>	2.2 (a)



ERA

eco  
logical  
AUSTRALIA

Objective	ER reference
<b>Soil</b>	
The company must ensure that operations at Ranger do not result in: environmental impacts within the Ranger Project Area which are not as low as reasonably achievable, during mining excavation, mineral processing, and subsequently during and after rehabilitation.	1.2 (e)
<b>Cultural</b>	
The company must ensure that operations at Ranger are undertaken in such a way as to be consistent with the following primary environmental objectives: maintain the attributes for which Kakadu NP was inscribed on the World Heritage list.	1.1 (a)
The company must rehabilitate the Ranger Project Area to establish an environment similar to the adjacent areas of Kakadu NP such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu NP.	2.1

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



### 6.3 References

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