

4 Stakeholder engagement



Issued Date: October 2022

Revision #: 1.22.0

TABLE OF CONTENTS

4	OVERVIEW OF STAKEHOLDER ENGAGEMENT	4-1
4.1	Engagement with Traditional Owners	4-8
4.2	Managing socio-economic impacts	4-8
	REFERENCES	4-10

FIGURES

Figure 4-1	Ranger Mine Stakeholder Matrix	4-5
------------	--------------------------------------	-----

TABLES

Table 4-1	Ranger Mine closure stakeholders	4-2
Table 4-2	Stakeholder Engagement Forums	4-5

APPENDICES

Appendix 4.1:	Ranger Mine Closure Stakeholder Consultation Register	4-11
---------------	---	------

Cover photograph: Nursery seedlings for revegetation being cared for by Kakadu Native Plant Supplies Staff

GLOSSARY

Below are key terms that are used in this section.

Key term	Definition
Environmental Requirements	The Ranger Environmental Requirements are attached to the S.41 Authority and set out Primary and Secondary Environmental Objectives establishing the principles by which the Ranger operation is to be conducted, closed and rehabilitated and the standards that are to be achieved.
Mine Closure Plan (MCP)	A dynamic plan presenting all past, present and future rehabilitation activities of the Ranger Project Area in order to demonstrate that closure activities will achieve the relevant Environmental Requirements. Submitted annually for approval, the plan provides updates of the preceding year.
Minesite Technical Committee (MTC)	<p>The Minesite Technical Committee, convened in accordance with Attachment A of the Working Arrangements for the Regulation of Uranium Mining in the Northern Territory dated 30 May 2005, is tasked with:</p> <ul style="list-style-type: none"> • Reviewing proposed and existing approvals and decisions under NT legislation • Reviewing technical information in relation to Ranger Mine, including monitoring data and environmental performance • Collaboratively developing standards for the protection of the environment • Developing strategies to address emerging issues <p>The MTC consists of the representatives of the Department of Industry, Tourism and Trade, the Supervising Scientist, ERA and the Northern Land Council. Representatives of the Commonwealth Department of Industry, Science, and Resources may also attend MTC meetings.</p>
Mirarr	<p>Mirarr is a patrilineal descent group. Descent groups are often called 'clans' in English and kunmokurrkurr in Kundjeyhmi language. There are several Mirarr clans with each one distinguished by the language they historically spoke (e.g. Mirarr Kundjeyhmi, Mirarr Urningangk, Mirarr Erre).</p> <p>The Mirarr are the Traditional Owners of the land encompassing the RPA.</p>

ABBREVIATIONS & ACRONYMS

Below are abbreviations and acronyms that are used in this section.

Abbreviation/ Acronym	Description
ACF	Australian Conservation Foundation
AFANT	Amateur Fisherman's Association (NT)
ARRAC	Alligator Rivers Region Advisory Committee
ARRTC	Alligator Rivers Region Technical Committee
ASIC	Australian Securities and Investment Commission
ASNO	Australian Safeguards and Non-Proliferation Office
DISR	Commonwealth Department of Industry, Science and Resources
DITT	Department of Industry Tourism and Trade
DPMC	Department of Prime Minister and Cabinet
EDONT	Environmental Defenders Office
ER(s)	Environmental Requirements
ERA	Energy Resources of Australia Ltd
GAC	Gundjeihmi Aboriginal Corporation
sialAEA	International Atomic Energy Agency
JKL	Jabiru Kalboldmakmen Limited
KKN	Key Knowledge Needs
MCP	Mine Closure Plan
MERRG	Monitoring Evaluation and Research Review Group
MOU	Memorandum of Understanding
MTC	Minesite Technical Committee
NGO	Non-government Organisations
NLC	Northern Land Council
NP	National Park
NT	Northern Territory
RCCF	Ranger Closure Consultative Forum
RPA	Ranger Project Area
RWD	Ranger Water Dam Formerly Tailings Storage Facility (TSF) or Tailings Dam
SIA	Social Impact Assessment
SSB	Supervising Scientist Branch
TSF	Former Tailings Storage Facility now Ranger Water Dam (RWD)
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WA	Western Australia

Abbreviation/ Acronym	Description
WARC	West Arnhem Regional Council
WASWG	Water and Sediment Working Group

4 OVERVIEW OF STAKEHOLDER ENGAGEMENT

The ERA approach to stakeholder engagement is centered on maintaining our relationships based on mutual respect, active partnership, transparency and long-term commitment. ERA will continue to connect with and respect Mirarr culture and the aspirations of local communities as we create a positive legacy and achieve world class, sustainable rehabilitation of the Ranger mine.

Our approach to stakeholder engagement has fostered collaboration and cooperation with a diverse range of stakeholders on the following key aspects of closure:

- the overall planning process and schedule;
- engineering and design criteria for technical aspects of closure such as water treatment, tailings transfer, backfilling of mine pits and the final landform design;
- post-mining land use, closure objectives and closure completion criteria;
- legal requirements and obligations associated with the various agreements for the mine and Jabiru township; and
- land tenure and governance.

Table 4.1 identifies the main external stakeholders engaged on the Ranger Mine closure and rehabilitation. Figure 4-1 demonstrates the linkages between stakeholders and ERA. The discussions with stakeholders are coordinated through the forums listed in Table 4-2. Appendix 4.1 provides a register of stakeholder engagements over the last 10 years.

All ERA employees and contractors are respectful of stakeholders and are engaged in delivering a positive legacy for the rehabilitation of the Ranger Mine.

Consultation with stakeholders is undertaken in accordance with an engagement framework that includes:

- ERA Communities Policy;
- ERA Communities and Social Performance Plan;
- ERA Communication Standard;
- ERA Community and Stakeholder Engagement Plan (ERA 2018);
- ERA Community Consultation, Engagement and Communication work instruction; and
- a number of existing engagement forums and tools.

Table 4-1 Ranger Mine closure stakeholders

Stakeholder group	Description
Traditional Owners and local Aboriginal groups	Gundjeihmi Aboriginal Corporation (GAC) Gundjeihmi Aboriginal Corporation Jabiru Town (GAC JT) Northern Land Council (NLC) Djabulukgu Association Gagudju Association Warnbi Aboriginal Corporation
Federal Government	Aboriginal and Torres Strait Islander Commission Australian Safeguards and Non-Proliferation Office (ASNO) Australian Securities and Investment Commission (ASIC) Department of Agriculture, Fisheries and Forestry Department of Foreign Affairs Department of Prime Minister and Cabinet (DPMC) Department of Industry, Science and Resources (DISR) Minister for Industry and Science Minister for Resources Parks Australia
Northern Territory Government	Department of Education Department of Health Department of Industry, Tourism and Trade (DITT) Department of Infrastructure, Planning and Logistics (DIPL) Department of the Chief Minister and Cabinet Minister for Mining and Industry Jabiru Kabolkmakmen Limited Northern Territory Treasury
Regional Council	West Arnhem Regional Council (WARC)
Primary regulatory committee	Minesite Technical Committee (MTC)
Regional scientific overview committee	Alligator Rivers Region Technical Committee (ARRTC)
Regional overview committee	Alligator Rivers Region Advisory Committee (ARRAC)
International agencies	International Atomic Energy Agency (IAEA) European Parliament standing committees World Heritage Committee of UNESCO

Stakeholder group	Description
Other NGOs (non-government organisations)	Amateur Fishermen's Association NT (AFANT) Australian Conservation Foundation (ACF) Environmental Defenders Office NT (EDONT) Minerals Council of Australia - NT Northern Territory Environment Centre World Wildlife Fund
Business community	Rio Tinto Uranium Rio Tinto Limited Shareholders Suppliers
Local community	Jabiru businesses/organisations Jabiru Kalbolkmakmen Limited (JKL) Gundjeihmi Aboriginal Corporation Jabiru Town Local social and recreational groups Residents Tourists

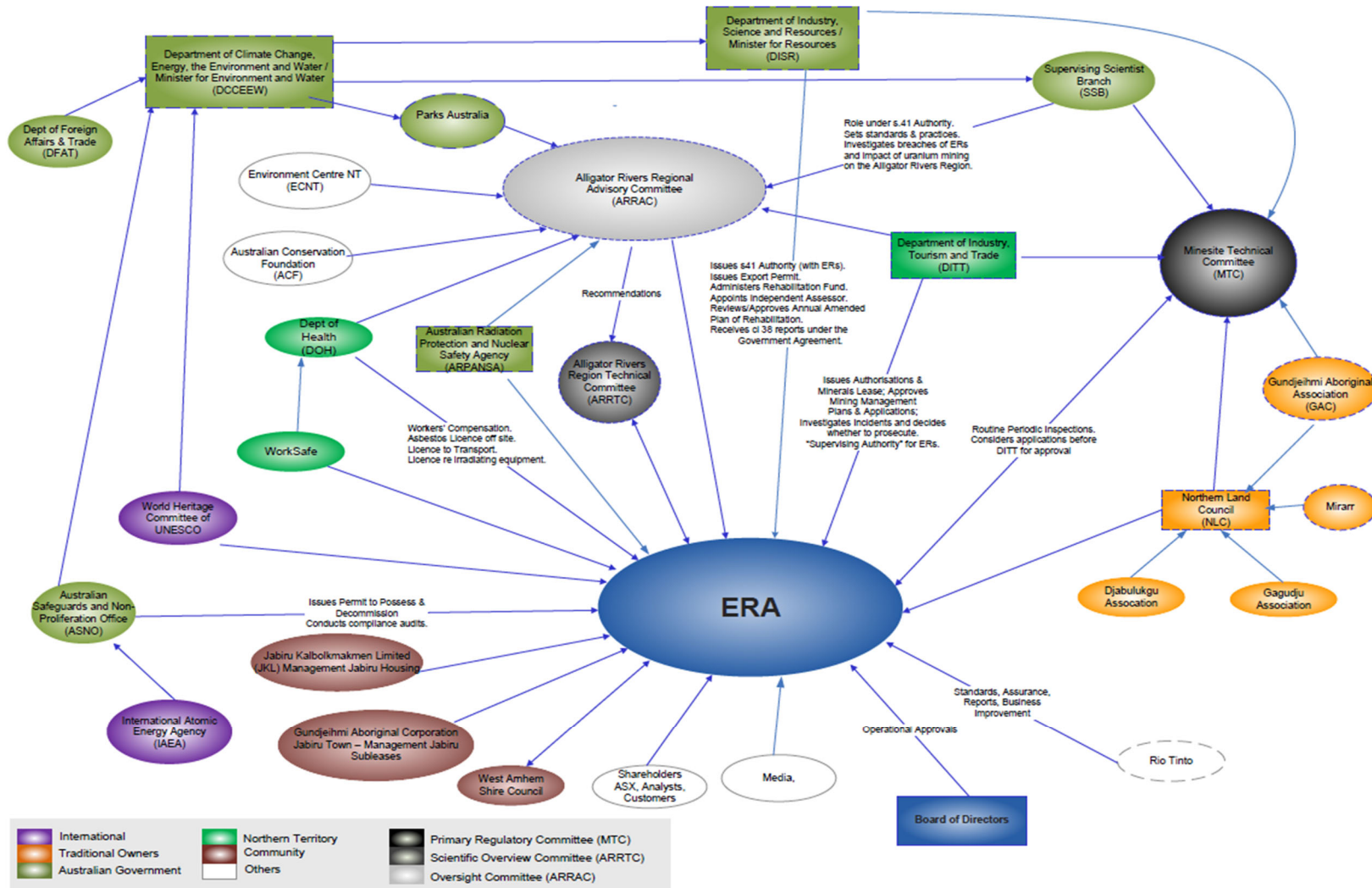


Figure 4-1 Ranger Mine Stakeholder Matrix

Table 4-2 Stakeholder Engagement Forums

Engagement forum	Frequency	Comment
Minesite Technical Committee (MTC)	Bi-annually (additional meetings held as required)	The MTC is the formal forum for key advisory and stakeholder groups to discuss and resolve technical environmental management matters relating to the closure of the Ranger Mine, regulatory functions of the NT Government, functions of the Supervisory Scientist, and the views of the Mirarr and other affected Aboriginal people. It includes representatives of the Northern Territory Department of Industry, Tourism and Trade (DITT) (Chair), Commonwealth Department of the Climate Change, Energy, the Environment and Water (DCCEEW), Supervising Scientific Branch (SSB), Energy Resources of Australia Ltd (ERA), Gundjeihmi Aboriginal Corporation (GAC) and the Northern Land Council (NLC) (the Commonwealth Department of Industry, Science & Resources (DISR) are invited as an observer).
Ranger Closure Consultative Forum (RCCF)	Monthly	The RCCF is a formal forum for ERA to discuss progress and matters relating to the closure of the Ranger Mine with the key stakeholder group representatives from the DISR, SSB, DITT, and the NLC/GAC. The purpose of the forum is to provide ongoing updates of closure activities, confidence in the closure strategy for achieving environmental requirements, information on upcoming approvals, and to receive feedback from stakeholders on studies, applications and the close-out progress of Key Knowledge Needs (KKN).
Alligator Rivers Region Technical Committee (ARRTC)	Bi-annually	The ARRTC was established under the Commonwealth <i>Environment Protection (Alligator Rivers Region) Act 1978</i> and reviews the appropriateness and quality of scientific research conducted by Northern Territory and Commonwealth Government agencies, ERA and others relating to protection of the environment from the potential impacts of uranium mining in the Alligator Rivers Region. Members include an independent Chairperson, the Supervising Scientist, independent scientific members, a member representing the NLC and a member representing environmental non-government organisations. http://www.environment.gov.au/science/supervising-scientist/communication/committees/arrtc
Alligator Rivers Region Advisory Committee (ARRAC)	Bi-annually	The ARRAC was established under the Commonwealth <i>Environment Protection (Alligator Rivers Region) Act 1978</i> and facilitates communication between Government, industry and community stakeholders on environmental issues associated with uranium mining in the Alligator Rivers Region. Members include an independent Chairperson, the Supervising Scientist, representatives from several Northern Territory Government departments, Office of the Administrator of the Northern Territory, several Commonwealth Government departments, non-government organisations (NGOs), ERA and other uranium mining/exploration companies that operate in the region.

Engagement forum	Frequency	Comment
		http://www.environment.gov.au/science/supervising-scientist/communication/committees/arrac .
Ecosystem Restoration Forum	As required, several per year	Communication and consultation with stakeholders focusing on ecosystem restoration closure criteria and KKNs.
Investor briefings	Bi-annually	Briefings provided by the ERA Chief Executive regarding ERA operations to all company shareholders.
Relationship Committee	Quarterly	The Relationship Committee was established under the Ranger Mining Agreement between ERA and the NLC in 2013 to review processes and ensure effective information sharing between ERA and the Mirarr Traditional Owners and their representatives.
Ministerial briefings	Regularly as required	Briefings are provided to both Federal and Northern Territory Ministers and senior advisors on operations of the Ranger Mine, including aspects of closure.
Kakadu Board of Management	Quarterly, ERA update provided bi-annually	Kakadu National Park (NP) is a park jointly managed by Parks Australia and the Traditional Owners of Kakadu. A board of management has been established as part of the governance structure for the NP and consists of Commonwealth Government representatives, Park Management and Traditional Owners from each region in the NP. ERA provides a regular operations update, including mine closure status, and consults with the broader Indigenous population through this forum.
State of the Nation	Quarterly	Presentations and question and answer sessions provided to all ERA personnel and contractors on ERA operations by either the Chief Executive or General Manager Operations including aspects of closure, Jabiru and stakeholder engagement.
Closure Criteria Working Group	No longer required	The Closure Criteria Working Group was established by the MTC for the purpose of developing the closure criteria for the rehabilitation of the Ranger Mine. The Closure Criteria Working Group also had sub-groups responsible for the development of the technical criteria for each of the following elements: landform, radiation, water and sediment, flora and fauna, soils and cultural. The MTC decided that closure criteria had progressed enough that this working group was no longer required. Rather, the specific technical groups would continue to develop criteria and report directly into the MTC.
Water and Sediment Working Group (WASWG)	No longer required	Communication and consultation with stakeholders focusing on surface water and sediment closure criteria and KKNs. These discussions now occur in each of the above-mentioned relevant forums.

Engagement forum	Frequency	Comment
Monitoring Evaluation and Research Review Group (MERRG)	No longer required	MERRG was formed in response to the submission of the application to progress Pit 1 final landform, in order to further communicate and consult with stakeholders regarding Pit 1 revegetation monitoring activities. Pit 1 has now undergone initial rehabilitation and monitoring success is reported in the above-mentioned relevant forums.

4.1 Engagement with Traditional Owners

ERA are committed to engaging with the Traditional Owners and local Aboriginal groups through our established engagement processes such as:

- In January 2013 a suite of agreements covering the Ranger Project Area were signed by the Mirarr Traditional Owners, ERA, the Northern Land Council, and the Commonwealth Government. These agreements cover the mining operations at the time and a range of pre-2013 issues. They also provide a structured approach for ongoing engagement and collaboration between the Gundjeihmi Aboriginal Corporation (GAC) and ERA.
- The 2013 agreements resulted in the formation of a relationship committee with ERA to promote information sharing and collaboration and an agreed approach to increasing opportunities for local Aboriginal participation in business development, training and employment.
- ERA engages GAC and Mirarr Traditional Owners through other channels (e.g. Cultural Reconnection Steering Committee) to discuss and negotiate on matters including water management, cultural heritage and environmental protection, employment and training, housing and town planning, involvement in decision making processes and royalties.
- The GAC and ERA are represented on the Kakadu West Arnhem Social Trust and each contribute funds on an annual basis.
- The Mirarr Traditional Owners are also represented via the GAC on the Closure Criteria Committee Working Group and are formal members of the Ranger Minesite Technical Committee (MTC).

4.2 Managing socio-economic impacts

The Ranger Mine has been a significant contributor to the socio-economic life of Jabiru, the West Arnhem region and the Northern Territory more broadly for more than 40 years. This has been through economic inputs and social aspects such as its residential workforce and community involvement.

The potential socio-economic impacts of the closure of the Ranger Mine have been the subject of considerable engagement with key stakeholders.

The contributions by ERA were documented in the Jabiru Social Impact Assessment (SIA) in July 2017. The ongoing participation in the Jabiru Taskforce by ERA, the outcomes of the Ranger closure feasibility study, and the funding commitment from the Commonwealth and Northern Territory Governments to support implementation of the Jabiru Masterplan have contributed to a clearer understanding of ERA's intended contribution to the community through the rehabilitation period.

A Memorandum of Understanding (MOU) on the future of Jabiru Township between the GAC, the Commonwealth and Northern Territory Governments, and ERA was signed in August

2019. The MOU commits the signatory parties to support the vision for Jabiru and the contribution each will make, including ERA. ERA will play an important role in working with stakeholders to agree a clear plan for Jabiru remediation activities and transition.

ERA acknowledge that considerable work remains to be done in planning for life beyond Ranger and agreeing how this is undertaken is the particular focus of the next phase of stakeholder engagement.

REFERENCES

- Energy Resources of Australia Ltd (ERA) 1981. *ERA Annual Report 1981*. Energy Resources of Australia Ltd (ERA). Available at <http://www.energyres.com.au/media/1981-annual-report/> [Accessed December 2016].
- Energy Resources of Australia (ERA) 2018. *Community and Stakeholder Engagement Plan*. Energy Resources of Australia Ltd (ERA), Darwin.

APPENDIX 4.1: RANGER MINE CLOSURE STAKEHOLDER CONSULTATION REGISTER

30 JUNE 2022 – 1 JULY 2012

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
30/06/22	Cultural Reconnection Steering Committee visit	ERA, NLC, GAC, Umwelt	<p>Visit to Ranger Project Area by Gundjeihmi Aboriginal Corporation traditional owners, as part of the Ranger mine cultural reconnection program. The visit included stops at:</p> <ul style="list-style-type: none"> Pit 1 The trial landform The stone tool scatter Coonjimba Billabong 	<p>A very positive response was received to the Pit 1 planting.</p> <p>Bininj mentioned that the andikkala herbs should only be planted in sand sheet or other sandy areas as they require very soft ground.</p> <p>Concerns were raised about the extent of bushland that would need to be removed, surrounding the trial landform, to reduce the incline of the final landform slopes.</p> <p>Discussions were had regarding a stone tool scatter identified in the proximity of the trial landform. It was pointed out by Bininj that the materials could not be covered over or removed.</p> <p>At Coonjimba Billabong there was discussion around the plan to take a sample of any edible plants that could be subjected to analysis. The two most accessible plant foods were said to be various parts of waterlilies and the corms of <i>Eleocharis dulcis</i>, known as <i>ankurladj</i> in Kundjeyhmi (a perennial aquatic grass-like sedge to 1m high with small tubers in the root system). A sample of edible corms of some water lilies were taken for analysis.</p>	Non-minuted
28/06/22	ERF meeting #23	ERA, SSB	<p>Progress on development and agreement of ecosystem sustainability and similarity criteria</p> <p>Progress updates on relevant projects</p> <p>Ecological risk assessment / KKN gap analysis</p> <p>State-Transition modelling</p>	<p>Libby M recognised and voiced the future need for the universal formatting of data in order for State and transition modelling etc. with the various datasets and methods of data collection to date. Needs to be a standard database to pull appropriate data from for particular assessments</p>	<p>SSB to send rearticulation of assessment methods to stakeholders by end of the week. ERA to then review and have comments by next ERF meeting (12 July).</p> <p>ERF group to review Anna Richards report in relation to physical soil structure criteria for justification and relevance for inclusion</p> <p>ERA to send out proposed next steps for state and transition model by 26 July ERF meeting to stakeholders</p>
17/06/22	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Brine injection Catchment management trial Pit 3 capping <p>ERA and SSB discussed the Pit 3 application adequacy assessment.</p>	None minuted	None minuted
16/6/22	Meeting	SSB, ERA	Update on scope of the TSF and Coonjimba groundwater studies	Scope to include review of previously defined sources terms with updated data including waste rock vadose zone leachate, and TSF plume	Scope elements requested are confirmed as included in the study scope

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
14/06/22	ERF meeting #22	ERA, SSB, NLC	<p>Progress on development and agreement of ecosystem sustainability and similarity criteria</p> <p>Progress updates on relevant projects</p> <p>Ecological risk assessment / KKN gap analysis / trajectory workshop</p>	<p>NLC asked whether LAA survey data could be integrated into existing App to be able to compare to reference plots</p> <p>NLC suggested conducting a live review of risk assessment questions with stakeholders</p> <p>SSB commented that there is a general view that fauna has not been addressed in current S&T model and needs to be populated</p> <p>NLC suggested that SSB data from other mine sites be sent and used by ERA in populating S&T model</p>	<p>Send supporting documentation for ecosystem closure criteria and future monitoring plans prior to meeting (end of the week)</p> <p>ERA and SSB to coordinate joint surveys for impact and recovery in June/July 2022</p> <p>SSB will try and report back to ERA by COB 14 June 2022 on ERA consultant S&T model report prior to ERA workshop on 15 June 2022</p> <p>SSB to follow up understorey workshop report review and comments from ERA</p> <p>SSB to consider additional value/information “naturalness” brings to criteria (e.g. is it duplicated in other criteria) and report back to ERF</p> <p>Discuss nutrient cycling sampling at TLF, Pit 1 and Jabiluka as well as full overstorey survey of TLF</p> <p>SSB and ERA to consider NLC response to the ecological risk assessment questions and report to ERF to decide next steps</p> <p>ERF to consider stakeholder (including ARRTC) involvement in, and process for, the “holistic” S&T model referred to by ERA</p>
10/06/22	3D Printed Model of the Final Landform catch up	ERA, NLC, CDU	Discussed development of an interactive platform to compliment the 3D printed model, for use in discussions with Traditional Owners.	None minuted	ERA to provide movie of rehabilitation process in language (as found on the ERA external website).
08/06/22	Routine Periodic Inspection	ERA, SSB, DITT, NLC	Pit 1 Revegetation and post wet season inspection	None minuted	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23-25/05/22	ARRTC 50	ARRTC members & observers	<p>ERA gave presentations on:</p> <ul style="list-style-type: none"> An overview of the reforecast for Ranger mine rehabilitation Key closure updates on a range of topics Metals and Sediments Targeted VAF and Site survey State and transition model Ranger Fauna Nest boxes TSF and Coonjimba catchment and contaminated material management study Ranger final landform 7.0 design Ranger PFAS investigation update Revegetation monitoring update <p>SSB gave presentations on:</p> <ul style="list-style-type: none"> Updates on a range of topics Comments on development of KKNs and new projects Joint project list PFAS update Radiation update Landform update Ecosystem restoration work Hazard and Risk Assessment of emerging contaminants Eutrophication update Long term monitoring strategy and transitioning between monitoring methods Transitioning between monitoring methods <p>Updates from stakeholders, including the Northern Land Council and Environmental NGOs.</p>	<p>For the SSB landform update Dr Wilkinson commented that in future, wet rainfall scenarios will be the most likely scenario. Dr Chris Humphrey confirmed a focus of proposed simulations would also be increasing the frequency and/or intensity of large rainfall events in model simulations.</p> <p>Dr Stauber noted that uncertainty was being qualitatively analysed in the VAF and queried if something like a Bayesian model could be applied where uncertainty is built in, providing a more quantitative analysis.</p> <p>For the SSB report on Hazard and Risk Assessment of emerging contaminants Dr Rumph highlighted there was a spuriously high potassium result for Georgetown Billabong and to check if this may be due to a low sample size or an outlier</p> <p>Prof Zichy-Woinarski noted that a comparison and assessment of temperature and other microclimate effects between nest boxes and natural hollows should be made.</p> <p>Mr Tayler noted that linking the project to SSB natural analogue sites, installing nesting boxes in these locations, would have advantages in utilising the environmental data associated them</p> <p>Dr Wilkinson commented that he is pleased to see the detail being incorporated into drainage lines as part of FLF 7.0.</p> <p>Prof Dixon recommended that Dr Humphrey review the new international ecological restoration standards in drafting of SSB's long-term monitoring strategy.</p> <p>Prof Dixon commented that grasses are a concern for revegetation and one issue to redress this dominance is to promote a more diverse understorey.</p> <p>Prof Zichy-Woinarski commented that there is a need to understand TLF trajectories and timing</p> <p>In future, there is opportunity to look at the role of the ARRTC committee, and at what point throughout the mine closure process their work is most valuable. The committee believes there needs to be increased integration and visibility of processes. The committee would like to see more work on risk assessments of emerging contaminants</p>	<p>NLC to give update on Cataloguing the Cultural World Heritage Values on the Ranger Project Area at ARRTC 51</p> <p>ERA to provide update on 2022 Mine Closure Plan at ARRTC 51</p> <p>SSB to send out Kate's Nabarlek papers/data on ecosystem restoration risk assessment prior to Nabarlek field trip</p> <p>ARRTC (Libby) to send decision tree to SSB and ERA between meetings</p> <p>Seek ARRTC involvement in ecosystem restoration state-transition model workshop planning for 2022</p> <p>ARRTC to be involved in ecosystem restoration KKN gap analysis</p> <p>SSB to share annotated outline of its long-term monitoring strategy with ARRTC for review and input</p> <p>ERA to provide presentation on the strategy behind and results from ERA's landform monitoring program (amended for clarity at ARRTC50, follow on from ARRTC 48.4). This presentation will include data on landform undulation.</p>
20/05/22	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Shellsol disposal VAF site surveys Pit 3 current activities <p>ERA and SSB discussed the Pit 3 application</p>	None minuted	None minuted
17/05/22	STARS Foundation visit to Ranger Mine	Jabiru STARS Foundation students & teachers, ERA	Took students around Ranger Mine to see key features of the mine, whilst discussing future careers in STEM.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
11/05/22	Routine Periodic Inspection	ERA, SSB, DITT, NLC, Coffey	Annual Ranger Water Dam Inspection	<p>Stakeholders inspected the RWD a selection of the points discussed and noted have been included.</p> <ul style="list-style-type: none"> • ERA noted that there were nine juvenile trees or shrubs on the internal walls. These have the potential to develop into large, deep rooted trees and thus need to be removed. ERA have engaged a contractor to remove the trees. ERA expects this work to be completed by mid-July. Coffey noted that anything that could become deep-rooted needs to be removed. • SSB noted that residual material had been stockpiled in the north western corner of the dam. ERA advised that all material had been removed to Pit 3. • SSB noted that erosion on the inner northern wall was more pronounced than during the inspection of the TSF to verify the removal of tailings which occurred a few weeks prior. • Coffey had conducted a visual inspection of the erosion on the North Wall on 11 May 2022. Coffey advised that there were sections of the North Wall where there is looser 'extra' material which is eroding. This material is Zone 1A clay core material, however, it's overbuild and not fully compacted clay core. • Coffey noted that visual inspections in the boat were useful. Visual inspections should be added to the TARP. 	There were no new agreed actions. Stakeholders noted that actions relating to vegetation removal and updating the TARP to include visual inspections would be included in the Coffey annual inspection report and including them in the RPI action list would be duplicative.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
06/05/22	Ranger MTC	ERA, DITT, SSB, NLC, GAC, DISER	<p>DITT provided an overview of compliance and regulatory matters.</p> <ul style="list-style-type: none"> Reported environmental incidents Plans to review check monitoring program for Ranger Location of the EMU (raised in the context of environmental reforms) Updates on the Authorisation review <p>ERA provided updates on:</p> <ul style="list-style-type: none"> Gamba grass reporting Turbidity exceedances in Gulungul Creek Dry season civil work son the Southern Boundary Road Schedule of major applications Catchment conversion trials <p>Discussion was had regarding titling and submission of applications.</p>	<p>SSB, GAC, NLC and ERA commented on the value of EMU being important to stakeholder confidence in ERA operations and validation of models.</p> <p>SSB advised that turbidity exceedances in Gulungul Creek, attributed to instrument failure or erosion causing localised turbidity in the vicinity of the probe, were not of environmental significance.</p>	<p>DITT to clarify with ERA relationship and titles of water monitoring documents.</p> <p>DITT to confirm acceptance of Ranger Wet Season Report 2021.</p> <p>ERA to present rehabilitation progress report at next MTC.</p> <p>ERA to finalise investigation reports for acid spill incident of 11 November 2021.</p> <p>ERA to finalise investigation reports for residual process water incident of 7 April 2022.</p> <p>DITT to work with SSB to review EMU check monitoring proposal for consideration at next MTC.</p> <p>DITT to finalise internal review of Authorisation and circulate draft Authorisation for comment.</p> <p>ERA to report on Gamba detections and eradication success at MTC analogous to browsing ant and Spigelia.</p> <p>ERA to conduct remediation works on Southern Boundary Road.</p> <p>ERA to submit to DITT additional detail for Pit 3 injection bores.</p> <p>ERA to submit an application for the catchment conversion trial including the caveat that if required the area will be reworked if needed to conform to the final landform approval, environmental risk assessment, anticipate outcomes and monitoring to demonstrate performance.</p> <p>DITT to formally acknowledge submission of final applications, circulate to members for comment, collate comment and formally request further information from ERA, ERA to submit response to request, DITT to circulate revised application to members for comment prior to making approval decision.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
28/04/22	ARRAC 57	ARRAC members & observers	<p>ERA presented on health and safety, process safety, environmental performance, water management, progressive rehabilitation, environmental studies and approvals updates.</p> <ul style="list-style-type: none"> Spigelia monitoring and tracking Browsing ant surveillance program 2021/22 wet season rainfall Pond and process water treatment and releases Magela and Gulungul water quality Tailings transfer Pit 3 capping and backfill. Revegetation of Walem Madjawulu-1 (Pit 1) Ranger Closure Project reforecast <p>The SSB provided an update on research, monitoring, assessment, audit and verification program activities between 1 July 2021 and 28 February 2022</p> <p>DITT provided an update on regulatory matters.</p> <p>Justin O'Brien provided a verbal update on behalf of the Gundjeihmi Aboriginal Corporation (GAC)</p> <p>Chris Brady provided a verbal update on behalf of the Northern Land Council</p> <p>Paul Purdon provided an update on behalf of the NT Environment Protection Authority</p> <p>Bradley Feldtman provided a verbal update on behalf of the NT Department of Health</p> <p>Cameron Lawrence noted that ARPANSA provided a written report to the committee and took the report to be read</p> <p>Matthew Crawshaw provided an update on behalf of the Department of Industry, Innovation and Science</p>	<p>In response to queries from Dr Charles Webb, Katherine Smith noted that the SSB research program is on track to have information available and projects closed in time to inform key rehabilitation-related activities.</p> <p>Chris Brady noted that the 99% species protection limit for PFAS had been exceeded, yet SSB's monitoring did not detect changes in biological communities. Keith Tayler noted that SSB's biological monitoring sites are upstream of Gulungul Confluence.</p> <p>Kirsty Howey noted that it was positive to see ERA acknowledging the true cost of rehabilitation and beginning pit backfill operations in line with expectations of the Traditional Owners.</p> <p>Keith Tayler noted that ERA are forecasting for 25 years of post closure monitoring and maintenance but that lease relinquishment will be based on achieving closure criteria not on a specific timeframe.</p> <p>Justin O'Brien noted that work should commence on tasks which will be triggered by the passing of the <i>Atomic Energy Act (Cwith)</i> amendment bill, such as preparing a new section 44 agreement. Matthew Crawshaw agreed that some work could begin prior to the bill passing.</p> <p>Cameron Lawrence noted that the process of finalising changes to the dose conversion factors is nearing completion. ARPANSA intend to publish changes to Radiation Protection Series 9 and 9.1 in the coming months. No impact on Ranger is expected as dose levels at Ranger are low.</p>	<p>ERA will present groundwater monitoring results to the Committee</p> <p>Members to advise if presentation slide packs can be uploaded to GovTeams</p>
22/04/22	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Drilling program BC distillate EC trigger value increase Pit 1 & CRS water quality monitoring update Visual erosion monitoring – Pit 1 & Stage 13 Catchment conversion project update Contaminated sites – PFAS interim results 	None minuted	<p>ERA to add split to recycle versus split to injection to the 'Brine injection' metric.</p> <p>ERA to update 'Ranger Mine Closure Applications Schedule' metric to include the updated FLF and TSF application dates.</p> <p>ERA to arrange an offline discussion around the reporting mechanisms for Pit 1 monitoring commitments made in the Pit 1 Ecosystem Re-establishment Plan.</p> <p>ERA to confirm that organic nitrogen has been included in the analysis suite for CRS-UG.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
13/04/22	Routine Periodic Inspection	ERA, SSB, DITT, NLC	Weeds, fire, and feral animal management	None minuted	<p>ERA to provide details of the environmental risks which were identified in the brine concentrator HAZOP assessment.</p> <p>ERA to provide an incident report for the gamba grass detection. ERA to provide an update on embedding light vehicle washdown procedures in the vehicle site access procedure.</p> <p>ERA to provide the investigation report for the process water spill during the decommissioning of the enhanced evaporation system.</p>
April 2022	Submission of the Kakadu Board Report for inclusion in the Kakadu Board of Management Meeting	Kakadu Board of Management members	<p>Provide information to the board on a range of topics including:</p> <ul style="list-style-type: none"> • Previous quarter operations • Rehabilitation at Ranger • Closure works • Funding • Corporate updates • Community updates 	N/A	N/A
10/03/22	Routine Periodic Inspection	ERA, SSB, DITT, NLC	Water treatment and release management and follow up on Gulungul Creek turbidity exceedances.	None minuted	ERA to undertake an investigation to identify the source of turbidity guideline value exceedances at GCLB during this wet season. Investigation could include monitoring turbidity at GCT0 to identify potential mine related source.
08/03/22	GAC Board Meeting	GAC Board, ERA, Stephanie Howden (Umwelt)	Discussed bush tucker project, Pit 1 rehabilitation progress, seed collection permit, Djarr Djarr rehabilitation, Cultural Heritage Audit mitigation works and Madjedbebe fencing project.	N/A	N/A
24/02/22	Pit 3 application stakeholder update	ERA, SSB, NLC	<p>Update on VAF, ALARA, WQMF associated with Pit 3 closure.</p> <p>TSF remediation in the Pit 3 application.</p>	Non-minuted	Non-minuted
18/02/22	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> • Monthly metrics and monitoring • Closure execution • Pit 1 PMP/SMP monitoring • Drilling program • OBS water treatment • BC off spec distillate sampling (results to date) • Drone Deploy • Catchment conversion trial • PFAS 	None minuted	<p>ERA to Develop “Process water to be Treated” metric.</p> <p>ERA to include presentation on Pit 1 CRS performance wet season to date at March RCCF</p>
11/02/22	Pit 3 application stakeholder update	ERA, SSB, NLC	Discuss issues and actions from stakeholder engagement on the water pathways risk assessment.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
10/02/22	Routine Periodic Inspection	ERA, SSB, NLC, DITT	Conversion of the Tailings Storage Facility (TSF) to a process water storage facility and process safety update.	None minuted	ERA to provide the consolidated Pit 3 geotechnical risk assessment, any associated findings and the outcomes of improvements to the prism array to stakeholders. ERA to provide the results of the HAZOP study to stakeholders.
08/02/22	ERF meeting #21	ERA, SSB, NLC	Progress on development and agreement of ecosystem sustainability and similarity criteria Progress updates on relevant projects Ecological risk assessment Ranger Mine Closure Plan	ERA and NLC flagged confusion around responsibility of work, on new project scopes, given some new SSB project work has been assigned against trajectory-related KKNs for which ERA has responsibility.	Send project/activity list to stakeholders for a cross-mapping exercise against SSB projects and KKNs Provide feedback and analyses from Anna Richards on current soil data Send SSB the data collection plan for upcoming full survey of TLF Organise reconnaissance trip to Paradise Farm with NLC and others. Send updated risk assessment timeline and new layout of question spreadsheet Coordinate SSB review of WAVES modelling validation for TLF and Pit 1
07/02/22	Casual catch-up	ERA (FE) SSB (KT)	Non-minuted	Non-minuted	Non-minuted
01/02/22	3D printed project model	ERA (SR) Water Solutions (JM) CDU (RF)	Review existing flood modelling files for suitability for use in the 3D printed project model for NLC/GAC.	Non-minuted	Non-minuted
28/01/22	Surface Water Model Comments	ERA, SSB, IGS (AL)	Discuss Surface Water Model comments from SSB for clarification prior to ERA responding. Prioritised work required for Pit 3 Application that needed to be responded to in the comments.	Non-minuted	Non-minuted
28/01/22	Pit 3 Application Stakeholder Meeting	ERA,	Pit 3 Application preparation updates following an MTC item request (MTC held 19/01/2022)	General feedback provided on items raised by ERA.	None minuted
20/01/22	Formal non-regulatory meeting	David Boustead, Regional Director, Dept of Chief Minister and Cabinet Jeanie Govan, Regional Development Officer West Arnhem	Discussed current and future social services and infrastructure services in Jabiru, ongoing regular catch-ups, future collaboration opportunities e.g. social impact assessment.	Non-minuted	Ongoing fortnightly catch-up and/or dependent on David's visit to Jabiru, organise site visit for NTG represents David will inform us of dates, continue to discuss social impact assessment and social services and infrastructure programs.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
19/01/22	Ranger MTC	ERA, DITT, SSB, NLC, GAC, DISER	<p>DITT provided updates on</p> <ul style="list-style-type: none"> The submission status of statutory documents. Other regulatory matters including: <ul style="list-style-type: none"> Draft Authorisation amendments S29 requirements Environmental Protection Act reforms, with a focus on Ranger related matters <p>ERA provided updates on:</p> <ul style="list-style-type: none"> Radiation monitoring Reforecasting Upcoming reports and plan submissions inc. potential Pit 3 plans after the BPT exercise Pit 1 final tailings level Rehabilitation reporting metrics HDS plant operation and sludge disposal <p>SSB provided an update on current projects and assessments.</p> <p>MTC discussed the publication of SSB verification reports.</p>	<p>DISER noted that the program for the February parliament sitting weeks were not yet available and as such there was no update on the Atomic Energy Act.</p> <p>NLC remain concerned about the 2026 timeline for completion of rehabilitation work.</p> <p>GAC provided comments on the draft authorisation amendments:</p> <ul style="list-style-type: none"> Supportive of NTG accepting MCP as the MMP Some terminology is unclear Remove obsolete sections as the mine is no longer in production Clarify what standalone applications are, then the process under the Working arrangements. They are primarily applications to the commonwealth minister outlined in the MCP. <p>DITT advised that there would be a separate meeting to discuss the amendments to the Authorisation.</p> <p>SSB requested a pre-submission briefing regarding the Pit 3 closure application.</p> <p>GAC noted that there is not yet a complete process for ERA to apply for and for the minister to issue a close out certificate.</p>	<p>ERA to advise MTC of future Noetic process safety visits.</p> <p>DITT to clarify whether ERA has submitted whole of site groundwater conceptual model in accordance with Annex D.6 of Ranger Authorisation.</p> <p>DITT to provide written advice on the legal standing of the small standalone application.</p> <p>DITT to circulate draft Ranger Water Quality Objectives Monitoring and Reporting Requirements document to MTC.</p> <p>DITT to clarify the legal standing of minor applications in writing. DITT to also provide a written clarification of the process.</p> <p>DITT to circulate draft S29 guidance to MTC members for comment</p> <p>ERA will provide MTC with an update for Spigelia creek line inspections</p> <p>ERA to submit application to vary final tailings level in Pit 1</p> <p>ERA to submit draft of Pit 1 close out report to MTC</p>
13/01/22	Routine Periodic Inspection	ERA, SSB, NLC	Radiation and <i>Spigelia</i> management	Stakeholders were satisfied with the outcomes of the investigation into the Radon monitoring non-conformance and that appropriate remedial action had either been taken or was planned.	None minuted
January 2022	Submission of the Kakadu Board Report for inclusion in the Kakadu Board of Management Meeting	Kakadu Board of Management members	<p>Provide information to the board on a range of topics including:</p> <ul style="list-style-type: none"> Previous quarter operations Rehabilitation at Ranger Closure works Funding Corporate updates <p>Community updates</p>	N/A	N/A
2022 ad-hoc	Meeting	ERA, GAC, Cth agencies	Discussions regarding amendments to the Atomic Energy Act	Non-minuted	Non-minuted
2022 ad-hoc	Verification site visits	SSB	Site visits to complete various closure verifications.	Non-minuted	Non-minuted
2022 weekly	Casual catch-up	ERA (SP) SSB (JM)	Non-minuted	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
14/12/21	ERF meeting #20	ERA, SSB, NLC	Progress on development and agreement of ecosystem sustainability and similarity criteria	SSB is finalising draft scopes for several new projects, which will be provided to stakeholders for comment prior to the next meeting. ERA will provide scopes/reports on S&TM, WAVES and fauna projects to stakeholders by early 2022 ERA noted that due to re-forecasting, the 2021 RMCP may not be submitted in its entirety. However, Chapter 5 Technical Studies may be provided to stakeholders for review soon.	None minuted
09/12/21	Routine Periodic Inspection	ERA, SSB, DITT, NLC	Site-wide water monitoring and management in preparation for the 2021/22 wet season.	Cleaning of the TSF walls and floor was substantively completed and cleaning verification had commenced. The clay floor was clearly visible and few evaporated salts were noted on the floor. At the time of the inspection, tailings were not being deposited over the lined disposal area in the south-western corner of the Pit rim. There was a substantial build-up of tailings along the lined section of the wall which will need to be washed into the pit. Stakeholders inspected RP2 from the embankment wall and noted that water levels were low in preparation for wet season rainfall.	ERA to provide evidence to stakeholders that the Brolga dredge underwent radiation clearance in preparation for being removed from site.
09/12/21	Aquatic monitoring meeting	BMT, ERA (SI), SSB (AH, CH)	Aquatic monitoring program needs.	Non-minuted	BMT updating monitoring program design. To be reviewed by SSB initially then presented to broader stakeholder group.
08/12/21	Relationship Committee Meeting	ERA, GAC	Provide update on various topics: <ul style="list-style-type: none"> Looking after country Cultural heritage Rehabilitation projects Jabiru housing remediation Community partnership General project works update	Comments recorded in RCM minutes	Response, actions and/or resolutions recorded in RCM minutes
02/12/21	Casual catch-up	ERA (FE) SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
01-03/12/21	Kakadu Board of Management Meeting	Kakadu Board of Management	ERA tabled its update to the Kakadu Board Report providing updates on a number of topics: <ul style="list-style-type: none"> March 2022 quarter operations review Rehabilitation reforecast Ranger rehabilitation Pit 3 methodology Funding	N/A	N/A
30/11/21-01/12/21	Pit 1 & TLF monthly monitoring	ERISS	Monitoring activities as per the Pit 1 and TLF monitoring plans including: <ul style="list-style-type: none"> Drone surveys (imagery and laser scanning) Walkthroughs General observations 	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
30/11/21	ERF meeting #19	ERA, SSB, NLC	<p>Progress on development and agreement of ecosystem sustainability and similarity criteria</p> <p>Project progress updates</p> <p>LAA inspection</p> <ul style="list-style-type: none"> ARRTC meeting reflections/follow up 	<p>Understorey workshop report currently being updating to address stakeholder comments</p> <p>SSB and ERA both are finalising scopes and internal approvals for new projects.</p> <p>Risk review workshop postponed until early 2022</p>	<p>ERA Compile available data on soil sampling on waste rock</p> <p>SSB provide rationale for 1 ha vegetation survey plot sizes</p>
26/11/21	Pit 3 BPT workshop	MTC stakeholders	Pit 3 capping works	Non-minuted	Non-minuted
24/11/21	Routine Periodic Inspection	ERA, SSB, DITT	TSF cleaning and CRS Sump	<p>Bulk tailings removal is being prioritised and well advanced.</p> <p>Remnant tailings are relatively easily distinguishable from other floor and wall materials such as clay and sand in most areas due to their distinctive colouring, fine texture and layered form.</p> <p>Minor dusting that remained within the TSF walls was noted in the south-eastern section of the TSF.</p> <p>A recent storm event had flooded parts of the TSF. Some large puddles of water remained.</p> <p>There were a substantial number of dead, mature melaleuca trees located in the former Djalkmara creek line near the confluence with Magela Creek. Dead trees tended to be in sandy areas. Healthy and stressed trees appeared in close proximity to the dead trees. Melaleuca trees in surrounding areas did not appear to be affected in the same way. The cause of the dieback is unknown. ERA advised that they would check the groundwater quality in the area using existing bores and provide an update to SSB.</p>	<p>ERA to provide stakeholders with an investigation report for the 14/11/21 sulphuric acid leak, when completed.</p> <p>ERA to provide stakeholders with an investigation report for the radon monitoring non-compliance, when completed.</p>
23/11/21	Workshop: Apply Mg vulnerability assessment framework to SWM results	ERA, SSB, NLC, GAC (M. Taylor), DITT, ARRTC (L. Rumpf), BMT	Scoring, uncertainty and process reviewed in the meeting for application to Coonjimba Billabong and a creek site. Informs aquatic ecosystem risk and ALARA at onsite waterbodies.	Videos (> 5 hours) and transcript (256 pages) of Microsoft teams meeting recorded.	Report due late January.
22/11/21	Meeting	ERA, SSB	TSF What is Clean Plan Inspection Test Plan	Non-minuted	Finalise ITP plan for review at upcoming RPI

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
17-19/11/21	ARRTC49	ARRTC members & observers	<p>ERA gave presentations on:</p> <ul style="list-style-type: none"> General comments and updates Updates on learnings from and monitoring of Pit 1 PFAS Closure criteria Vulnerability assessment framework Water pathway risk assessment Ranger surface water model Key issues and research at Jabiluka <p>SSB gave presentations on:</p> <ul style="list-style-type: none"> Ecosystem restoration work plan and discussion of forthcoming risk assessment WASQ work plan ERL restructure PFAS monitoring investigations SSB monitoring strategy and long term monitoring plan <p>NESP presented, for endorsement on project and KKN close-out, on</p> <ul style="list-style-type: none"> WS7H: RES-2017-022 Ecohydrology and sensitivity of riparian flora <p>WS7F: RES-2018-002 Effects of surface and ground water egress of mining-related solutes on stream ecological connectivity</p>	<p>Dr Stauber commented that there is no faith in the current PFOS 99% protection guideline value (GV). Data show so far that PFOS would not be an issue with exceedances of 99% GV. She is happy that ERA are undertaking more sampling.</p> <p>Dr Wilkinson commented that SSB need to ensure statistical design is considered in developing monitoring programs, referring to monitoring programs on turbidity as a measure of erosion of the landform.</p> <p>Dr Mudd noted that it was good to see that a source-pathway-receptor approach is being undertaken for SSB PFAS sampling</p> <p>Dr Stauber raised the problem of what to compare the PFAS monitoring data to, given the guideline is flawed. It is difficult to determine risk when we don't yet have sensible GVs.</p> <p>Dr Wilkinson said it was good to see how calibration of the Ranger Surface Water Model has performed well and robust sensitivity analysis has been undertaken. This is a good tool for assessing scenarios and meeting closure criteria. Would be good to start quantifying peak concentrations vs the associated conditions, including probabilities.</p> <p>ARRTC have the sense that they are missing the latent opportunities of face-to-face discussion with online meetings and look forward to being able to travel again. ARRTC are happy to meet and assist between meetings.</p> <p>Dr Gavin Mudd commented that Ranger is a big hall mark for the world, IUCN etc and the landowners. It is critical that issues are ironed out so we can work towards a future adaptive management on the right trajectory.</p> <p>Prof Dixon informed everyone that they are finalising, through SER, international standards for mine lands ecological restoration. He noted the drafting committee, and the board, are extremely focused on key sites and Ranger is one that is mentioned due to its World Heritage location.</p>	<p>SSB to present review of SSB Landform Work Plan</p> <p>SSB to provide review of SSB Radiation Work Plan</p> <p>ARRTC to provide ERA with access to unpublished re-vegetation advice</p> <p>SSB to provide ARRTC with the scopes of the 4 new projects to address the ecosystem trajectory which covers use of data from mine sites such as Nabarlek, Jabiluka etc</p> <p>ERA to provide presentation on upcoming work related to State and Transition Model</p> <p>SSB to follow up presentation on Nabarlek including but not limited to Kate Harries PhD work</p> <p>ERA to follow up presentation on Jabiluka ecosystem restoration – including maps of the area</p> <p>SSB to organise ARRTC field trip associated with ARRTC50 (May 2022)</p> <p>ERA to Present on RMCP. Presentation to indicate areas of major change (e.g. complete re-writing of Chapter 5)</p> <p>ARRTC to provide to ERA and SSB an alternative approach to structured expert elicitation to assess vulnerability that could inform ERA's Vulnerability Assessment Framework.</p> <p>SSB to discuss assessment methods for closure criteria on erosion/turbidity with interested parties</p> <p>ARRTC to obtain & distribute (Clem Duvert's NESP) ecohydrology paper to ARRTC, SSB and stakeholders</p> <p>SSB to discuss RES-2021-014 (fauna closure criteria, goals) and RES-2021-015 (fauna closure criteria, indicators) with Prof Woinarski</p> <p>ERA to provide ARRTC with seed metric data that show the disparity between viable seed and germinable seed to ensure seed when used is at its optimum germinable state</p> <p>SSB to add KKNs to slide 13 of ERL presentation and distribute to ARRTC</p> <p>ERA to provide/ discuss with Dr Rumpff BPT docs and framework to inform discussions on uncertainty and decision making</p>
12/11/21	Casual catch-up	ERA (FE) SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
10/11/21	Meeting	ERA SSB	PFAS SAQP	Non-minuted	Non-minuted
09/11/21	Casual catch-up	ERISS ERA	ARRTC preparation	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
08/11/21	Erosion and sediment working group	SSB (JM, MS, AC) ERA (SR, SP, YF)	Update on dry season upgrades at Pit 1/CRS for erosion and sediment control.	Non-minuted	Non-minuted
26-27/10/21	Pit 1 & TLF monthly monitoring	ERISS	Monitoring activities as per the Pit 1 and TLF monitoring plans including: <ul style="list-style-type: none"> Drone surveys (imagery and laser scanning) Walkthroughs General observations	Non-minuted	Non-minuted
20/10/21	Cultural Reconnection Steering Committee	NLC, GAC, CDU	3D Model of Ranger Project Area <ul style="list-style-type: none"> Ranger Mine visit to burial sites, grinding stones, natural rocky escarpments 	Non-minuted	Non-minuted
20/10/21	Site visit	ERISS	Inspection of the LAAs	Non-minuted	Non-minuted
19/10/21	ERF Meeting #18	SSB, NLC	Progress on development and agreement of ecosystem sustainability and similarity criteria Jabiluka and Djarr Djarr revegetation monitoring Project progress updates Scope/logistics of risk review workshop	Chris H noted that SSB intends to present to ARRTC changes to SSB's ecosystem restoration research program at the upcoming November meeting. Mike W noted the possibility that the upcoming risk assessment review may identify additional work that needs to be done (i.e. KKNs).	Provide a) available Jabiluka vegetation data (ideally in spreadsheet format), b) a bibliography of previous reports and species and c) a list of species that have been planted.
15/10/21	RCCF	GAC, NLC, DITT, SSB, DISER	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring Closure execution project updates Pit 1 revegetation monitoring updates Aquatic ecosystem vulnerability background Ecological vulnerability assessment framework	None minuted	ERA to revise Pit 3 bathymetric survey slide to better visualise tailings levels across Pit 3. ERA to develop alternative process water metric following completion of tailings transfer to Pit 3.
14/10/21	Routine Periodic Inspection	SSB, NLC, DITT	<ul style="list-style-type: none"> Pit 1 wet season preparation, TSF cleaning and R3 Deeps decommissioning. 	SSB advised that ERA was still to come back to stakeholders on their verification techniques for clean and until this occurred verification activities could not commence. Stakeholders also noted that the strategy for verifying that the floor and walls are clean of tailings needs to be agreed before rip rap is replaced on the dam walls or other preparatory works that may mask cleaning activities are undertaken.	ERA to organise a meeting with stakeholders to discuss the strategy for verifying tailings cleaning and obtain consensus on the verification program. ERA to provide a memo to stakeholders explaining the changes to the GCT2 sump.
05/10/21	ERF Meeting #17	SSB, NLC	Progress on development and agreement of ecosystem sustainability and similarity criteria Jabiluka and Djarr Djarr revegetation monitoring Project progress updates	SSB just received a draft report from Sean Bellairs, summarising the understorey functional group workshop. Development of assessment methods and patch metrics/naturalness indicator is not fully developed/agreed and needs to be progressed.	SSB to provide a copy of draft report compiled by Sean Bellairs, summarising outcomes the understorey functional group workshop. SSB to provide rationale for 1 ha vegetation survey plot sizes. SSB to forward relevant information and instructions prior to risk review meeting.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
30/09/21	Meeting	SSB, NLC, DITT	Surface Water Modelling Update – Sensitivity Analysis and Validation Calibration Update.	General comments on uranium and sulfate partitioning in billabongs, use of decay functions within the model, and applicability and use of developed natural run-off water quality relationships. Formalised question to be provided by stakeholders to ERA following review of reports.	Modelling reports to be provided to stakeholders, reports distributed to stakeholders on 18th October 2021.
28-29/09/21	Pit 1 & TLF monthly monitoring	ERISS	Monitoring activities as per the Pit 1 and TLF monitoring plans including: <ul style="list-style-type: none"> Drone surveys (imagery and laser scanning) Walkthroughs General observations	Non-minuted	Non-minuted
27/09/21	Meeting	SSB Coffey ERA	<ul style="list-style-type: none"> Conversion of the TSF to a water dam 	Non-minuted	Non-minuted
24/09/21	RCCF	GAC, NLC, DITT, SSB, DISER	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring Closure execution project updates PFAS progress update & introduction to Cardno team Airport contaminated sites investigation Pit 1 Ecosystem Re-establishment Plan monitoring commitment updates	None minuted	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23/09/21	ARRAC 56	ARRAC members & observers	<p>ERA presented on health and safety, process safety, environmental performance, water management, progressive rehabilitation, environmental studies and approvals updates.</p> <ul style="list-style-type: none"> Spigelia monitoring and tracking Browsing ant surveillance program Pond and process water treatment and releases Decommissioning of process plant and make safe activities Process water treatment Ranger 3 Deeps final backfill Tailings transfer Pit 3 capping and backfill. Work to determine the optimal capping method and purchase wick material is underway. Revegetation of Walem Madjawulu-1 (the area formally known as Pit 1) has commenced Nursery propagation and seed collection is on track for revegetation of the final landform A cultural reconnection activity has been undertaken on Pit 1 with collaboration with Traditional Owners to install habitat areas (rocky outcrops). A detailed PFAS site investigation is underway Ongoing studies include groundwater modelling, surface water modelling, the contaminated sites investigations, bush tucker project, Pit 1 and stage 13.1 surface water monitoring and radiation dose assessment The land application area soil assessment has been completed The acid sulfate soils investigation indicated that there are ASS and this will require more investigation 	<p>Chris Brady noted inconsistencies between the ERA and DITT reports, the absence of Nabarlek and Jabiluka check monitoring, progress towards Ranger mine closure timeframes and uncertainty around the process for granting exemptions from the Authorisation.</p> <p>Justin O'Brien noted that a letter provided from DITT to ERA regarding tailings management and the Ranger Authorisation requirements on 23 September 2021 was confusing.</p>	Secretariat to circulate Susan O'Sullivan's paper to all members.of minutes.
21/09/21	Erosion and sediment working group	SSB (JM, MS, AC) ERA (SR, SP, YF)	<ul style="list-style-type: none"> Update on dry season upgrades at Pit 1/CRS for erosion and sediment control. 	Non-minuted	Non-minuted
20/09/21	Meeting	SSB Coffey ERA	Conversion of the TSF to a water dam	Non-minuted	Non-minuted
17/09/21	Casual catch-up	ERA (FE) SSB (KT)	Non-minuted	Non-minuted	Non-minuted
15/09/21	Informal meeting	SSB (JL, MS) ERA (EF, SL, SR) Subject matter experts (TC, GH)	CAESAR Lisflood modelling discussions on parameter optimisation	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
13/09/21	Informal meeting	CDU (RF) ERA (SR)	Catch up meeting to discuss progress on 3D printed model of the Ranger Final Landform	Non-minuted	Non-minuted
09/09/21	Erosion and sediment working group	SSB (JM, MS, AC) ERA (SR, SP, YF)	Update on dry season upgrades at Pit 1/CRS for erosion and sediment control.	Non-minuted	Non-minuted
09/09/21	Informal meeting	SSB (JM, MS, AC) ERA (SR, SP, AD, FS, YF, TB)	Discuss engineering limitations of accurately measuring flow into CRS.	Non-minuted	Non-minuted
09/09/21	Routine Periodic Inspection	SSB, NLC	Contaminated sites, hazardous substances, waste and hydrocarbon management.	<p>The rubber waste laydown area was located on the top of the western stockpile. This is not the area shown in the NMP001 Non-Mineral Waste Management Plan in Figure 2. This will require updating in the next iteration of the plan. ERA advised that the former rubber waste laydown area, shown in Figure 2 of NMP001, was buried in the process of backfilling Pit 1 and decommissioned as part of constructing the Pit 1 final landform.</p> <p>Stakeholders opportunistically inspected a short section of the haul route for transfer of tailings between the TSF and Pit 3. The road appeared well maintained with no visible tailings spills.</p> <p>Stakeholders noted that resourcing for emergency response team was a red light and had been for two months.</p>	<p>ERA to review digital waste disposal records to confirm that data is being entered correctly from hardcopy waste disposal forms.</p> <p>ERA to consider altering the hard copy receivables form to mirror the waste tracking register so that inputting data is more straightforward.</p> <p>ERA to update the contaminated sites register to include the new general waste landfill location.</p>
07/09/21	ERF Meeting #16	SSB, NLC	<p>Progress on development and agreement of ecosystem sustainability and similarity criteria</p> <p>Final Landform Application Scope</p> <p>Closure Trajectory Monitoring Plan</p> <p>Pit 1 baseline soil sampling</p> <p>Fire report</p>	<p>Agreement that nutrient cycling criteria have reference to trajectories removed.</p> <p>ERA circulated a draft table of topics to be addressed in the Final Landform Application (FLA) for feedback to help with ERA's reforecast. SSB indicated that the list still appears to reflect what should be included in the FLA.</p> <p>ERA circulated a first pass draft of a Completion Criteria Monitoring Plan (vegetation only) which they are looking at including in the 2021 RMCP - some preliminary discussion about monitoring plots (size, permanent vs random).</p> <p>LAA inspection scheduled October.</p> <p>It was agreed that the report by Garry Cook is a useful compilation of relevant information on effects of fire on vegetation in the region and has some key considerations that ERA can use in developing a fire management strategy for the rehabilitated site.</p>	<p>SSB seek clarification from Anna Richards (CSIRO) on rationale for retaining the trajectory/similarity to reference aspect within the litter decomposition nutrient cycling indicator.</p> <p>SSB to provide feedback to ERA on the draft Final Landform Application topics, to identify if there may be any major gaps.</p> <p>SSB to provide feedback to ERA on the draft Closure Trajectory Monitoring Plan.</p> <p>ERA to provide a copy of draft LAA remediation plan.</p> <p>SSB to provide ERA with a copy of the Sampling Analysis Quality Plan for soil nutrient and biota sampling.</p> <p>ERA to consult with SSB and NLC on identifying the next steps for development of fire management strategy for revegetation.</p>
31/08/21-01/09/21	Pit 1 & TLF monthly monitoring	ERISS	<p>Monitoring activities as per the Pit 1 and TLF monitoring plans including:</p> <ul style="list-style-type: none"> Drone surveys (imagery and laser scanning) Walkthroughs <p>General observations</p>	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
31/08/21	Jabiluka MTC Meeting	MTC members	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> • Fire, weed and track management activities on site • Mulch & direct seeding trials • Vent shaft monitoring • Potential vegetation reference sites and revegetation survey 	<p>SSB noted that the Jabiluka lease is due for renewal in 2024 and raised concerns regarding the status of closure planning.</p> <p>NLC reiterated that personnel accessing the Jabiluka lease should complete the Jabiluka induction prior to accessing the site.</p>	ERA to provide further correspondence with a proposal for a post-fire resilience study at Djarr Djarr for considerations by stakeholders.
30/08/21	Informal meeting	SSB (JM) ERA (SR)	<p>Billabong sediment sampling results and report</p> <ul style="list-style-type: none"> • Pit 1/CRS erosion and sediment monitoring 	Non-minuted	Establish an erosion and sediment working group (ERA, SSB) to meet fortnightly
27/08/21	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> • Monthly metrics and monitoring • Closure execution project updates • Catchment conversion quarterly update • Pit 1 2020/2021 wet season workshop summary <p>Pit 3 backfill design overview</p>	None minuted	<p>ERA to organise a meeting of the Tailings working group to discuss the consolidation model update and density profile, to determine what will be required for the Pit 3 Application.</p> <p>ERA to add MOL to graphs in the monthly metrics slide pack.</p> <p>ERA to review and update the format for studies slides presented at RCCF to align with the SSB/ERA joint project list.</p> <p>ERA to recommence inclusion of the brine injection metric now that the system has re-started.</p> <p>For future reporting of remnant tailings transfer amounts, provide reference to total amount requiring transfer to show overall progress to plan</p> <p>ERA to add a tracking register for monitoring commitments made in the Pit 1 Ecosystem Re-establishment Plan by SSB and ERA.</p> <p>Pit 1 sediment/erosion monitoring group to be established.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23/08/21	ARRTC 48	ARRTC members & observers	<p>ERA provided the committee with a virtual tour of the Ranger mine including the Tailings Storage Facility, Pit 1 and Stage 13.</p> <p>ERA provided updates on:</p> <ul style="list-style-type: none"> key closure activities including decommissioning of the processing plant, process water treatment, R3D final backfill, tailings dam, Pit 3 capping and backfill, revegetation of Pit 1 and seed collection of local native species. PFAS, noting that Cardno have been engaged to undertake the work and is currently undertaking a gap assessment and developing a sampling and analysis quality plan (SAQP) to identify where additional investigation needs to take place. Spigelia eradication project. Work to update closure criteria. Solute transport studies, supporting groundwater studies and the surface water model. ERA presented on ecosystem trajectories and developing an adaptive management plan. 	<p>Dr Rumpff advised she would provide Ms Parry with some additional references on decision making frameworks. Rapid and qualitative assessment of risks is a good approach.</p> <p>Prof Kingsley advised that structured expert elicitation is a very important mechanism in the absence of all the information. Further, direct seeding and associated technologies will be important in the future for secondary plantings and responding to deviations for example replanting after catastrophic disturbance.</p> <p>Dr Wilkinson advised that adaptive management plans needs to be developed to address potential issues, there is concern that progressive rehabilitation will happen across site without strategies in place.</p> <p>Dr Stauber advised ARRTC wants to see how projects/KKNs feed into assessment of applications and the framework that connects to monitoring and management plans.</p> <p>Prof Woinarski noted additional knowledge needs/risks are being identified as time goes on so there is a need to see these are captured. ARRTC also wants to see a well-targeted comprehensive monitoring plan for ecosystem restoration.</p>	<p>ERA to provide update on learnings from and monitoring of Pit 1 which covers</p> <ul style="list-style-type: none"> Ecosystem restoration (esp. comparison of different planting trials) Landform design and performance <p>ERA to advise whether the new GW modelling included assessment of changes to the model run times, calibration, or convergence</p> <p>ERA to provide presentation on strategy for monitoring program – to include priorities and an example</p> <p>ERA to provide ARRTC with S&T model report (April 2020) along with SSB and NLC's comments</p>
10/08/21	ERF Meeting #15	SSB, NLC	<p>Progress on development and agreement of ecosystem sustainability and similarity criteria.</p> <p>ARRTC close-out process.</p>	<p>SSB performed preliminary cross-mapping exercise to assist in identifying indicators with monitoring overlap.</p> <p>ERA presentation on high-level issues/questions regarding criteria trajectory monitoring plan.</p> <p>Risk review workshop needed to ensure that SSB and ERA projects over the next few years are addressing the highest priority knowledge needs.</p>	Schedule risk assessment workshop in October.
09-13/08/21	Annual Stakeholder Audit	SSB, NLC	Assessment of ERA's compliance with selected environmental management plans submitted in support of the Mining Management Plan.	The audit found that ERA was generally compliant with the commitments made in their management plans and was undertaking activities as required by their internal procedures.	A list of key findings (non-conformances, conditional findings and observations) was provided to ERA by email on 21 September 2021. Follow-up discussions were held between selected members of the audit team and ERA representatives during RPIs in October and November 2021. These meetings allowed ERA to demonstrate progress towards addressing findings from the audit.
06/08/21	GW and SW modelling meeting	ERA, INTERA, SSB, IGS	<p>INTERA presented GW concentration maps</p> <p>Additional conceptualisation discussion for GW/SW interaction</p>	Non-minuted	Non-minuted
05-06/08/21	Pit 1 & TLF monthly monitoring	ERISS	<p>Monitoring activities as per the Pit 1 and TLF monitoring plans including:</p> <ul style="list-style-type: none"> Drone surveys (imagery and laser scanning) Walkthroughs <p>General observations</p>	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
August 2021	Submission of the Kakadu Board Report for inclusion in the Kakadu Board of Management Meeting	Kakadu Board of Management members	Provide information to the board on a range of topics including: <ul style="list-style-type: none"> Previous quarter operations Rehabilitation at Ranger Closure works Funding Corporate updates Community updates 	N/A	N/A
30/07/21	Casual catch-up	ERA (FE) SSB (KT)	Key topics of discussion were: <ul style="list-style-type: none"> Annual Stakeholder Audit on 9 August Upcoming ARRTC. Covid cancelled site visit Upcoming Visit by Keith and his leader Simon Banks delayed due to Covid Resources Atomic Energy Act amendment Pit 3 capping Authorisation update Airport handover and contaminated sites assessment 	Non-minuted	Non-minuted
29/07/21	GAC visit	GAC Cultural Reconnection Steering Committee, KNPS	Visit to Pit 1 to see newly constructed rock pile habitats and check on seedlings planted in March 2021. <ul style="list-style-type: none"> Visit to Georgetown Billabong. 	Non-minuted	Non-minuted
28/07/21	Meeting	ERA, SSB, DITT	Meeting to discuss Authorisation review and update	Non-minuted	Non-minuted
21-22/07/21	Routine Periodic Inspection	SSB, NLC	Pit 1 Monitoring Plan. Pit 1 ecosystem establishment trials status.	None minuted	ERA to provide stakeholders with the outcome of the investigation into the tailings dusting incident of 1 July 2021. ERA to provide a presentation on the ARCHER risk management system with a focus on environmental risk management.
19/07/21	Criteria workshop	SSB, NLC	Meeting to agree on ecosystem restoration closure criteria goals and indicators.	Non-minuted	Agreement achieved
16/07/21	RCCF	GAC, NLC, DITT, SSB, DISER	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring KKN close-out and joint project list PFAS monthly progress update Closure execution project updates Upcoming process water treatment approvals	None minuted	None minuted
07/07/21	Meeting	ERA, SSB, DITT, NLC	<ul style="list-style-type: none"> Pit 3 Capping Backfill and Waste Disposal application 	Non-minuted	Non-minuted
01/07/21	Casual catch-up	NLC (Chris Brady) CDU (Rohan Fisher) ERA (Sarah Reid)	Second discussion held about the development of a 3D Model of the Ranger Final Landform. Timelines for project execution established.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
25/06/21	Ecosystem Restoration Forum (ERF #13)	SSB/ERISS, NLC	Closure Criteria – Ecosystem sustainability and similarity	<p>MP indicated that ERA would be interested in testing vegetation data within undisturbed areas of the RPA. CH suggested that it is very likely that any of these areas within the RPA would fall within the bounds of the reference ecosystem.</p> <p>Discussion on the species richness indicator. CB suggested that overstorey and midstorey do not need to be distinguished – only overstorey (i.e. > 1.5 m) is needed.</p> <p>In relation to the updated draft vegetation distribution indicator, MP indicated that it is difficult to visualise how this would look and that ERA needs time to consider this further. CB suggested that patchiness may not be visible within a single vegetation type (i.e. as opposed to between vegetation types). LM agreed that it depends on scale.</p> <p>CB suggested that the sustainability indicator for recruitment could potentially be simplified to state that key species are recruiting.</p>	<p>SSB to provide a ‘shiny app’ that will allow ERA to test species lists against the reference ecosystem for compositional similarity.</p> <p>SSB to provide an illustration of how the vegetation distribution indicator would be assessed.</p>
25/06/21	Pit 3 tailings consolidation	SSB (John Miller)	Pit 3 consolidation	Non-minuted	Non-minuted
24/06/21	Casual catch-up	SSB, Newcastle University	Meeting to discuss proposed parameter optimisation for the Landform Evolution Model.	Non-minuted	Non-minuted
24/06/21	Understorey workshop	SSB/ERISS, NLC, Experts from CDU and KNPS	Determining a ‘functional’ approach for understorey species classification and closure criteria indicators.	Non-minuted	First draft of functional approach and understorey classification complete.
23/06/21	Meeting	ERA, SSB, DITT, NLC	Pit 3 Capping Backfill and Waste Disposal application	Non-minuted	Non-minuted
18/06/21	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 Ecosystem Re-establishment Plan update KKN close-out and joint project list Tailings transfer and Pit 3 tip head Surface water pathways risk assessment Brine injection status update <p>Process water treatment status update</p>	None minuted	ERA to report on catchment conversion works each quarter at RCCF.
18/06/21	Casual catch-up	SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
17/06/21	WASWG	SSB, NLC, GAC, DIIT, Rio Tinto	Water & sediment KKNs and associated projects.	Non-minuted	Non-minuted
16/06/21	Site inspection	ASNO	Inspect decommissioning works and assess conformity with the approved decommissioning plan.	Non-minuted	Non-minuted
11/06/21	Paradise Farm visit	SSB, NLC	Appropriate fire regimes for revegetation and surrounding ecosystems.	Non-minuted	Non-minuted
11/06/21	Source Term discussion	SSB (AL), ERA (DS)	Discussion on feedback regarding potential shallow groundwater source below and downstream of RP1 in the post closure solute transport modelling.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
10/06/21	Ecosystem Restoration Forum (ERF #12)	SSB/ERISS, NLC	Closure Criteria – Fauna criteria	Discussed shifting ant approach away from ‘functional’ to align with other fauna groups. Also discussed whether ‘exotic’ ants could be covered by new indicator; NLC noted that transformer ant species would be main concern, as opposed to just presence of exotic species. Discussion on whether tree hollows (habitat availability) requires an indicator, as long as there is confidence that ecosystem trajectory will occur.	SSB and NLC review comments provided by ERA on current draft of similarity and sustainability indicators. SSB to meet with CDU experts to clarify their advice on what approach could be taken in regards to ants and exotic fauna approach.
10/06/21	Routine Periodic Inspection	SSB, DITT, NLC	Post-2020/21 wet season inspection of Jabiluka site. Progress of rehabilitation and general site condition.	Stakeholders and ERA noted an increase in native grass cover at the toe in the former decline portal area and in the central area of the Jabiluka rehabilitating area. The reestablishment of vegetation, including ground cover, in these areas had only met with limited success previously. ERA advised that they had seeded the area with several grass species in December. DITT noted that improvement in the condition of revegetation in the disturbed Jabiluka footprint. NLC noted ERA’s commitment to provide a report on the expected trajectory and management of the rehabilitated vegetation at Jabiluka to stakeholders which was recorded at the November 2020 RPI. SSB noted that the Jabiluka lease is due for renewal in 2024 and that closure criteria had yet to be established for Jabiluka.	Stakeholders to complete ERA Jabiluka induction. At the Jabiluka MTC scheduled for 1 July 2021: <ul style="list-style-type: none"> Stakeholders to discuss potential regulatory implications of this requirement ERA to present on the methods for seeding ERA to present on progress of vent shaft sampling ERA to establish a mechanism to collaboratively plan and control fires at Djarr Djarr to support ongoing weed management efforts.
08/06/21	Casual catch-up	NLC (CB), CDU (RF), ERA (SR)	Discussion held about the development of a 3D Model of the Ranger Final Landform.	All in agreement with 3D Model development approach, objectives and proposed outcomes.	ERA to commence works with CDU on 3D Model development.
08/06/21	Meeting	ERA, SSB, DITT, NLC	Pit 3 Capping Backfill and Waste Disposal application	Non-minuted	Non-minuted
07/06/21	Casual catch-up	SSB (KT), ERA (FE, SP)	Non-minuted	Non-minuted	ERA and SSB agreed that it is important that ARRTC has reviewed all of the science underpinning the major applications and the RCMP prior to SSB providing endorsement for approval. ERA and SSB will develop an integrated research schedule for the August ARRTC meeting. ERA will include project projected timings/resources in the project schedule. SSB will tighten up the project/KKN closeout process. SSB and ERA will adhere to the hard deadline for submission of items to ARRTC. ERA will provide a sample project reporting dashboard to provide some ideas as to how ERA/SSB can best portray progress against schedule to ARRTC.
02/06/21	Meeting	ERA, SSB, DITT, NLC	Pit 3 Capping Backfill and Waste Disposal application	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
28/05/21	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 and Stage 13 UAV monitoring trial Pit 1 revegetation Catchment conversion works 2021 drilling works Acid Sulfate Soils ARRTC follow-up discussion <p>PFAS scope and approach</p>	None minuted	<p>ERA to add total water treated slide to the metrics slide pack.</p> <p>ERA to report on catchment conversion works each quarter at RCCF.</p>
27/05/21	Ecosystem Restoration Forum (ERF #11)	SSB/ERISS, NLC	<p>Conceptual reference ecosystem (CRE).</p> <ul style="list-style-type: none"> Closure Criteria (CC) - Sustainability and Similarity ecosystem restoration standards; Fauna criteria. 	<p>Agreement was reached that the CRE species list is reasonable and representative of common species in the area. Noted that there is still some uncertainty in relation to fire species and timing of planting.</p> <p>Discussion on necessity for including 'framework' in vegetation goals and indicators.</p>	<p>All to review revised similarity and sustainability indicator tables, for discussion at the next meeting.</p> <p>ERA to provide relevant background information pertaining to understorey functional groups.</p> <p>All to review revised fauna goal/attribute table, for discussion at the next meeting.</p>
27/05/21	AARTC member site visit	ARRTC member (SW), SSB	Site visit held to show the Landform ARRTC member around Ranger Mine, and talk through the current status of closure and proposed final landform execution.	Non-minuted	Non-minuted
24-25/05/21	ARRTC 47	ARRTC members & observers	<p>SSB gave presentations for discussion and endorsement on;</p> <ul style="list-style-type: none"> WS4A_SSB RES-2018-003 Identification and mapping of Groundwater Dependent Ecosystems; and CT1A-BOTH RES-2017-032 Cumulative risk assessment for Ranger mine site rehabilitation and closure- Phase 2 (aquatic pathways). <p>SSB gave a presentation on the revision of the Landform Stability Rehabilitation Standard, for information.</p> <p>ERA gave presentations for information on;</p> <ul style="list-style-type: none"> 1221-09 WS5A-BOTH Water Pathway Risk Assessments Presentation (Release pathways onsite); 2020/2021 sediment sampling investigation (ERA); and 1221-11 WS1A-ERA (Non-aquatic) Contaminated sites sampling presentation (ERA). <p>ERA gave a presentation on 1260-06 WS3D-ERA Surface water groundwater interaction for discussion and endorsement.</p> <p>ERA and SSB gave joint presentations on;</p> <ul style="list-style-type: none"> 1260-04 WS6C-ERA Eutrophication Risk Study, for discussion and endorsement; and <p>Joint ERA/SSB Ecosystem Restoration Workplan and Development of Standards/Closure Criteria, for information.</p>	<p>ARRTC raised the issue of the 2026 date and arrangements beyond that date. Mr Taylor noted the Department of Industry, Science, Energy and Resources has prepared a Bill that will likely be passed well ahead of the 2026 date.</p> <p>Dr Stauber reiterated her concerns about the lack of information about the influence of radionuclides on periphyton and the method used to derive radionuclide guidelines.</p> <p>ARRTC continues to see significant risk around the monitoring framework. Ensuring issues are being captured with a line of sight is extremely important.</p> <p>Dr Mudd noted it was paramount for ARRTC to visit sites to help validate what is discussed in meetings.</p> <p>Mr Tayler expressed concern regarding access to preliminary PFAS data and transparency.</p>	<p>ERA to prepare a presentation on Jabiluka covering key issues and research.</p> <p>Prepare a presentation on the strategic monitoring programs.</p> <p>Provide timetable of individual work components, showing interdependencies as part of the joint project list.</p> <p>Provide radionuclide results as part of the 1221-06 Aquatics sediments project close out.</p> <p>Respond to Dr Stauber question of why the GCT2 site wasn't sampled for metals when it was sampled for ASS.</p> <p>Provide information on PFAS work.</p> <p>Distribute report on 1221-09 WS5A-BOTH Water Pathway Risk Assessment (release pathways onsite) for ARRTC's information</p> <p>SSB and ERA, in consultation with ARRTC Chair, to provide a timetable for future adaptive management related activities (as a possible precursor to a workshop).</p> <p>Provide a presentation on groundwater maps.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
21/05/21	Pit 3 tailings consolidation	SSB (John Miller)	<ul style="list-style-type: none"> Pit 3 consolidation 	Non-minuted	Non-minuted
19-20/05/21	Ecosystem Closure Criteria Workshop	SSB/ERISS, ARRTC (part) NT experts	Workshops to progress the development of ecosystem (vegetation and fauna) closure criteria.	Agreement on some indicators for goals	Continue to develop closure criteria for inclusion into the Ranger Mine Closure Plan
13/05/21	Routine Periodic Inspection	SSB, DITT, NLC	Ranger TSF Annual Inspection (incorporating post wet season inspection).	<p>Stakeholders noted that the washdown area at the TSF west wall notch has the potential to be trafficked by light vehicles that may not be subject to wash down procedures. These vehicles may then potentially transfer tailings outside of the TSF footprint. Additionally, workers on foot may inadvertently walk through tailings and transfer tailings outside of the TSF footprint.</p> <p>J. Miller (SSB) asked if the dam engineer was satisfied that TSF drawdown was completed in accordance with recommendations. G. Ralls (Coffey) responded that he was satisfied that drawdown was completed in accordance with recommendations and there was negligible surveyed impact from the drawdown.</p> <p>J. Miller (SSB) asked if leaving the dam dry will impact its ability to hold water. G. Ralls (Coffey) does not anticipate any issues of that nature. G. Ralls (Coffey) noted that the wet season and wave action would pose a risk to the exposed clay core and that existing rilling indicates that more could occur. ERA plans to reinstate the rip rap. G. Ralls (Coffey) noted that the dam has been holding water and solids for many years and this bodes well for using it as a water storage for three wet seasons.</p>	<p>ERA should implement a strategy (such as area isolation and boot cleaning) to ensure tailings in the washdown areas are not transferred outside of the TSF footprint by vehicles or workers.</p> <p>ERA to provide the investigation report, RP2 water quality data and ITP for a leak in the underdrain bore pipeline.</p>
10-13/05/21	Society of Ecological Restoration Australasia (SERA) Conference	Conference participants	<p>Presentation on Ranger's Species Establishment Research Program (SERP).</p> <p>Presentation on Trial Landform (TLF).</p> <p>Booth to display ERA's closure plan and showcase some of our nursery grown plants.</p>	Non-minuted	Non-minuted
07/05/21	Ecosystem Restoration Forum (ERF #10)	SSB/ERISS, NLC, CSIRO	<p>Conceptual reference ecosystem (CRE).</p> <p>Closure Criteria (CC) - Sustainability and Similarity ecosystem restoration standards.</p> <p>Progress on joint ERA-SSB workplan and ARRTC questions.</p>	<p>It was agreed that some species found in reference sites would require further discussion as to whether they are included in the final CRE species list.</p> <p>Discussion on inclusion or omission of certain culturally-desired species.</p>	<p>SSB to provide DBH and stem density data corresponding with the updated CRE species list.</p> <p>ERA to finalise proposed planting list for discussion.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
06/05/21	MTC	MTC Members	<p>DITT proposed a merger of MMP and MCP and aim to update the Authorisation in Q1 2021.</p> <p>ERA provided updates on:</p> <ul style="list-style-type: none"> Environmental incidents Standalone application schedule, submission times, stakeholder consultation strategies and assessment turn around expectations Staff resourcing in relation to key closure/rehabilitation activities Status and progress of statutory reporting approvals Tailings transfer TSF cleaning and “what is clean?” Pit 3 application changes <p>DITT provided updates on:</p> <ul style="list-style-type: none"> Authorisation 0108 variation Assessment of MMP Environmental/mining regulatory reform Licencing of extraction/abstraction bores <p>DISER provided an update on the Annual Plan of Rehabilitation</p>	<p>SSB and NLC expressed concern that ERA may not have enough resources to undertake tasks simultaneously, particularly related to ecosystem reestablishment.</p> <p>SSB highlighted that in some cases in the past the turnaround time for ERA responses for comments were long, suggesting a resources shortfall. In particular concerns were raised regarding responses to Management Plans which have time implications such as the Water Management Plan.</p> <p>SSB and NLC advised they are very supportive of verification process and commended ERA on their cooperation and engagement.</p>	<p>ERA to advise MTC members of dates of the NOETIC process safety visits and if attendance is possible.</p> <p>All present agreed to expedite their own responses and inputs to improve turnaround times.</p> <p>ERA will complete a preliminary gamma survey of the dry TSF floor, timing will be dependent on floor being available, (ie clean and dry), to test effectiveness as a verification tool for demonstrating the TSF floor is clean and compliant with ER 11.2</p> <p>ERA to investigate drone surveys as alternative verification methods.</p> <p>ERA to arrange a follow up workshop or discussion in June to consider results of surveys and other assessments options e.g. drone surveys.</p> <p>ERA to add a scope section to the TSF "what is clean" plan to make clear that it does not include transport of tailings.</p> <p>MTC agreed that ERA can commence wicking as there are no perceived risk to the external environment from the process of installing wicks.</p> <p>DITT to write letter to ERA referencing 2019 MCP acknowledging environmental risk is low and that the MTC Members agree for ERA to commence wicking.</p> <p>DITT recommended that stakeholders not review the 2021 MMP, as it replicates the 2020 MCP, and going forward the 2021 MCP will cover similar matters as in the MMP. It was agreed that the 2021 MMP would not be assessed.</p> <p>DITT to write to ERA, advising they have submitted the 2021 MMP in compliance with their authorisation. Draft letter to be circulated to members.</p> <p>DITT to liaise with the DEPWS and provide MTC with details of how the environmental regulatory reform changes will affect Ranger.</p> <p>ERA to present on the implications to the long term water management strategy in consideration of Pit 1 interim water management results to date, at the May 2021 RCCF.</p>
05/05/21	Casual catch-up	NLC	ERA approach for including culturally important species in revegetation and planting lists.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
May 2021	Submission of the Kakadu Board Report for inclusion in the Kakadu Board of Management Meeting	Kakadu Board of Management members	Provide information to the board on a range of topics including: <ul style="list-style-type: none"> Previous quarter operations Rehabilitation at Ranger Closure works Funding Corporate updates Community updates	N/A	N/A
30/04/21	GW catch-up	ERA (DS, EF, SV), SSB (AL), IGS	<ul style="list-style-type: none"> General catch-up to review additional data requirements and drilling plan. 	Non-minuted	Non-minuted
27/04/21	Ecosystem Restoration Forum (ERF #9)	SSB/ERISS, NLC	<p>Conceptual reference ecosystem (CRE) - sorghum/fire issues.</p> <p>Closure Criteria (CC) - Sustainability and Similarity ecosystem restoration standards.</p> <p>Ecosystem restoration standards workshops.</p>	SSB proposed to accommodate a functional groups approach for understorey, reflecting proposals for a functional classification for understorey, discussed by the group at the previous meeting	<p>ERA and NLC to consider the draft indicators and report back to the group.</p> <p>ERA and NLC to consider material provided by SSB (complete species list) and report back to the group.</p> <p>SSB to prepare for the group a summary of different functional classifications that could be considered in preparing species lists for understorey.</p>
23/04/21	GW and SW modelling general catch-up	ERA (DS, EF), SSB (AL, CH, AH, BM, JM)	General groundwater and surface water catch-up to discuss state of current studies, stakeholder review of studies, future projects including drilling and introduction of new team at SSB to support groundwater and surface water modelling studies.	SSB communicated that a formal letter will be sent to ERA later that day requesting ERA to provide additional detail from solute transport studies. Letter received by ERA after the meeting on 23/4/2021.	ERA to action information request.
23/04/21	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
22/04/21	ARRAC 55	ARRAC members & observers	<p>ERA presented on health and safety, operational, environmental, water and closure activity updates.</p> <ul style="list-style-type: none"> Practical completion of tailings dredging Cleaning of TSF wall and floor underway Revegetation status updates on Pit 1 and Stage 13 Seed collection status for final landform Completion of a number of groundwater model studies Surface water model configuration and calibration updated following stakeholder recommendations Bushtucker project Flora samples taken and report completed Fauna sampling project scheduled for late 2021 Pit 1 and Stage 13 surface water monitoring review planned for end of 2020/2021 wet season <p>Radiation dose assessment is underway</p>	Keith Tayler noted that the short-term risks of contamination below the TSF are being managed; however a longer-term plan may need to be developed.	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
16/04/21	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring ARRTC review preparations by ERA and SSB Make safe and decommissioning Pit 1 revegetation Pit 3 wicking trial TSF cleaning 	None minuted	<p>ERA to present on 2021 drilling plan at May RCCF.</p> <p>ERA to present on Pit 1 Revegetation post planting survey at May RCCF.</p> <p>ERA to provide further update on wicking works at May RCCF.</p>
15/04/21	Routine Periodic Inspection	SSB, DITT, NLC	<ul style="list-style-type: none"> Revegetation, nursery and ecosystem re-establishment. 	<p>Stakeholders noted some areas of water logging, in Pit 1 WM1C. ERA advised that in research trial planting, planting was avoided in areas with evidence of waterlogging. Waterlogging is recorded in monitoring observations.</p> <p>Stakeholders noted the growth of saplings at Stage 13.1A since they were planted, approximately 12 months ago. Most plants appeared in good health however some eucalypt mortality was observed.</p>	None minuted
13/04/21	MERG	SSB/ERISS	Ecosystem decision making framework	Agreement on plan to place a decision making framework into the Pit 1 monitoring plan	None minuted
13/04/21	Ecosystem Restoration Forum (ERF #8)	SSB/ERISS, NLC	<p>Conceptual reference ecosystem (CRE) - sorghum/fire issues.</p> <p>Closure Criteria (CC) - responsibilities; sustainability.</p> <p>Nutrient cycling reports.</p>	<p>ERA and NLC have concerns that Sorghum dominance is the result of high fire frequency, which has resulted in impacts on KNP. This is not considered a sustainable fire regime, for either the surrounding area or the rehabilitated site.</p> <p>Can take on a functional approach to understorey grass, rather than the specific species.</p> <p>ERA is responsible for developing closure criteria and SSB is responsible for ecosystem restoration standards. Collaboration is needed to ensure that all stakeholders are in agreement prior to ERA putting this forward for ministerial approval.</p>	<p>SSB to re-examine fire history data for the reference ecosystem and map out areas of fire intensity.</p> <p>SSB to provide complete species list that has been updated following inclusion of the two new Georgetown reference sites.</p> <p>SSB to review their original comments for ERA nutrient cycling report to see if there is anything critical that should be amended.</p>
07/04/21	RSWM Update Meeting #6	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Meeting to discuss parameters to be assessed as part of RSWM sensitivity analysis.	Non-minuted	Non-minuted
30/03/21	Ecosystem Restoration Forum (ERF #7)	SSB/ERISS, NLC, CSIRO	<p>Conceptual reference ecosystem (CRE) - sites; species.</p> <p>Closure Criteria (CC) - sustainability.</p>	<p>Concerns about the regularly burnt areas within the reference ecosystem. Focus on sustainable pattern of fire.</p> <p>Discussion on dry species (<i>E. phoenicia</i>, <i>E. tectifera</i> and <i>E. tintinnans</i>).</p> <p>Removal of Georgetown plots 1 and 2 and include the two recently surveyed plots in the CRE.</p> <p>Concerns about the amount of Sorghum in plots, maybe look at some sites with a lower fire frequency (potentially less sorghum).</p>	<p>Draft report on sustainability closure criteria to be distributed prior to sustainability closure criteria workshop.</p> <p>Members to provide dot points of thoughts/comments regarding CRE for next meeting and consider the issues of fire and sorghum.</p> <p>SSB to re-examine fire history data for the reference ecosystem and map out areas of lower fire frequency.</p> <p>NLC to ask about some sites known to have lower fire frequency.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
25/03/21	Planting ceremony	GAC, NLC, Cultural Reconnection Working Group	First planting event at Pit 1	Non-minuted	Non-minuted
12/03/21	Casual catch-up	SSB (KS)	Non-minuted	Non-minuted	Non-minuted
10/03/21	Landform KKN and project catch-up	ARRTC Landform member, SSB	Discussion on KKN's and projects relating to Landform and agreement on actions to progress towards close out.	Non-minuted	Non-minuted
8-9/03/21	Surface Water Pathway Risk Assessment	SSB/ERISS, NLC observing	Water and sediment quality. Risk assessment of mine contaminants to the aquatic ecosystem and people (first workshop).	Non-minuted, workshop discussions reflected in scores entered into risk spreadsheet or changes to descriptors and/or methods of assessment.	Review of process and preliminary results via ARRTC, WASWG, RCCF. Draft report distribution for review. Second workshop planned for H2 2021.
05/03/21	Fauna Closure Criteria Workshop	SSB, ARRTC (partial) and NT experts	Review proposed fauna closure criteria.	General agreement on the key goals to take forward.	Another workshop to be planned.
04/03/21	Ecosystem Restoration Forum (ERF #6)	SSB/ERISS, NLC	Conceptual reference ecosystem (CRE) - riparian and seasonally-inundated areas; Georgetown site selection.	NLC emphasised the need to determine what are the constraints, and hence what is an appropriate reference community, before undertaking surveys. It was generally agreed the priority should be finalising the woodland reference ecosystem, how this will be assessed, before looking at potentially constrained areas later.	SSB to plot locations of the two new Georgetown reference sites against existing sites and provide to stakeholders.
04/03/21	Ranger MMP	DITT	Discussion of the Mining Management Plan and options to incorporate into the Mine Closure Plan.	Non-minuted	Non-minuted
19/03/21	RCCF	GAC, NLC, DITT, SSB, DISER	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 research planting update TSF clean and Pit 3 dumping update SSB provided updates on: <ul style="list-style-type: none"> Copper and zinc guideline values Toby McGrath from Water Solutions Pty Ltd gave a presentation on the simulations and results from the Surface Water Model update.	None minuted	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
11/03/21	Routine Periodic Inspection	SSB, DITT, NLC	Land use management (Weed and Fire management).	<p>C. Brady (NLC) and M. Welch (SSB) raised a concern about weed management. Currently, ERA does not have a formal weed management plan for the area. These areas do not have their own specific management plan, however are within the remit of the Ranger Weed Management Plan.</p> <p>Stakeholders suggested that a risk rating system be more formally developed, for weed management, such that priority is also given to areas where the risk is on the boundary with KNP and around waterways that can lead offsite.</p> <p>Stakeholders recommended that current or future surface areas that are likely to be part of the final landform surface should be assessed as part of weed mapping to identify if seed banks require management in advance of final landform design. This information will be required to inform the future Final Landform Application and demonstrate that weed impacts will not impact on rehabilitation success.</p>	None minuted
25/02/21	Site visit	GAC, NLC, Cultural Reconnection Working Group	Inspection of Georgetown area for potential reference sites (CRE).	Non-minuted	Non-minuted
23/02/21	Pit 3 tailings consolidation	SSB (John Miller)	Pit 3 consolidation	Non-minuted	Non-minuted
19/02/21	GW catch-up	ERA (DS, AN), DITT (MS, LH)	General catch-up to discuss current GW closure projects and operational reporting with DITT.	Non-minuted	Non-minuted
19/02/21	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Higher (and lower) rainfall dates Pit 1 update (CRS, sediment monitoring, moisture probes) Stage 13.1C proposal and Stage 13 learnings TSF tailings transfer to Pit 3 Pit 3 capping update CPT, VST and tailings sampling update <p>February 2021 sediment sampling update</p>	None minuted	None minuted
18/02/21	Site Visit	GAC, NLC, Cultural Reconnection Working Group	<p>Inspection of Pit 1, Stage 13.1A & B, and TLF.</p> <ul style="list-style-type: none"> Discussion on revegetation strategy. 	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
February 2021	Submission of the Kakadu Board Report for inclusion in the Kakadu Board of Management Meeting	Kakadu Board of Management members	Provide information to the board on a range of topics including: <ul style="list-style-type: none"> Previous quarter operations Rehabilitation at Ranger Closure works Funding Corporate updates Community updates	N/A	N/A
15-16/02/21	ARRTC 46	ARRTC members & observers	<p><i>Ecosystem restoration</i></p> <p>SSB/ERA presented on CRE/CC work plan.</p> <p>ERA presented on Species Establishment Research Program (SERP) and matrix.</p> <p>Project close-out discussions for:</p> <ul style="list-style-type: none"> RES-2019-017 (ESR5B_BOTH): Developing restoration trajectories to predict when the restored site will move to a sustainable ecosystem. RES-2017-007 (ESR1C_BOTH): Deriving species composition measures and their environmental correlates to assess ecosystem restoration similarity. RES-2019-012 (ESR1C_BOTH): Deriving vegetation community structural attributes that inform the conceptual reference ecosystem. RES-2017-004 (CT2A_BOTH): Cataloguing the natural World Heritage values on the Ranger Project Area. <p>Discussion and endorsement of KKN: ERS1A Tech Advice #29 "Intermittent flooding savanna species composition".</p> <p><i>Climate Change</i></p> <p>Comments on Climate Change research in Australia (Parks, NESP & ERA) and SSB projects of CC relevance.</p> <p>Status of ERA climate change studies (groundwater uncertainty analysis, future studies).</p> <p>Project close-out discussion for CT1A_BOTH. Ranger Uranium Mine Closure First Pass Climate Change Risk Assessment.</p> <p><i>Ground and surface waters</i></p> <p>Q&A session, with INTERA, discussing the reports submitted to ARRTC on the Solute Source Terms, Solute Transport model and Uncertainty Analysis.</p> <p>Presentation and discussion with Toby McGrath (Water Solutions Pty Ltd) on the Surface Water Model Update and GW-SW Interaction.</p> <p>KKN/Project close out discussions for:</p> <ul style="list-style-type: none"> KKN/Project: Update Groundwater Solute Transport Modelling and Conceptual Model (2019 INTERA Rpt). 	<p>Summary of comments from ARRTC included:</p> <ul style="list-style-type: none"> The Committee thanked SSB and ERA for the excellent work and ongoing effort, leadership, patience and persistence as complicated and complex issues were progressed. ARRTC is pleased that so many KKNs/Projects were closed out for the meeting. ARRTC would like to see the feedback on closed KKNs/projects wrapped into a process so that a line of sight is maintained on where the feedback is taken up e.g., future KKNs, existing KKNs, workflows. There has been good progress made in the conceptual reference ecosystem space. It will be important to document and explain any outstanding future research needs required going forward e.g., fauna, hollow-dependent taxa, artificial hollows etc. ARRTC are keen to evaluate the big picture, and it would be prudent for ARRTC to ensure the building blocks in the workflows are scientifically robust and fit for purpose. The committee notes that monitoring, early warning of failures and technical and management responses at Ranger mine will become increasingly important as the mine enters its rehabilitation stage. An integrated risk/adaptive management framework will be important going forward in order for ARRTC to maintain oversight of risks, technical matters underpinning assessment and to confidently close out KKNs and projects. Crucially, a long period of monitoring and maintenance is required after 2026 to ensure appropriate progress and consolidation of the rehabilitation. The Committee has little visibility yet of the programs proposed to ensure this necessary monitoring and adaptive management can or will occur. <p>ARRTC remains concerned in the uncertainty of future resourcing and support over the coming years and beyond 2026. Any significant reduction in resourcing at this critical time will have a negative impact on the successful and robust closure and rehabilitation of the Ranger mine.</p>	<p>ARRTC Secretariat to organise a time, before ARRTC 47, for ERA to have a discussion with Scott Wilkinson relating to the iterative development of the Ranger landform design. SSB to attend.</p> <p>SSB/ERA to ensure future close-out project/KKN documentation and presentations indicate relationship(s) between the project/KKN being closed and other current/future work.</p> <p>ERA with assistance from SSB to provide compendium on previous work on climate change effects on the Ranger project area, what work is proposed to be undertaken in future, what will be excluded.</p> <p>SSB to give a presentation at ARRTC 47 on the current PhD project at Nabarlek.</p> <p>SSB to give a presentation at ARRTC 47 on its current and long-term monitoring strategy.</p> <p>SSB to distribute work completed on tracer studies at Ranger.</p> <p>SSB to amend documentation for WS7C close out to rearticulate the risk to stygofauna associated with breaches of the Mg:Ca ratio of <9:1.</p> <p>SSB to include a KKN for Ecological Investigations Levels (EILs) needed for the contaminated sites assessment.</p> <p>ERA to give presentation at ARRTC 47 on ERA sediment sampling results.</p> <p>SSB to present on progress on ecosystem restoration workplan memo.</p> <p>ERA to summarise the core discussions around climate change held with fire experts, and re-issue the Climate Change report with that summary as an appendix</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
			<ul style="list-style-type: none"> RES-2009-002 (WS5A_BOTH): The toxicity of U to sediment biota of Gulungul Billabong. RES-2020-021 (WS7A_SSB): Deriving site-specific guideline values for copper and zinc. KKN WS7A_SSB: Are current guideline values appropriate given the potential for variability in toxicity due to mixtures, modifying factors and different exposure scenarios? <p><i>Contaminated sites</i></p> <p>ERA presented on billabong sediment sampling and ASS next steps.</p> <p>ERM presented on WS1A-ERA LAA soils assessment.</p> <ul style="list-style-type: none"> Reporting on KKN/Project close-out, based on supplied documentation and presentations given during the meeting. 		
12/02/21	Ecosystem Restoration Forum (ERF #5)	SSB/ERISS, NLC	Conceptual reference ecosystem (CRE) - riparian and seasonally-inundated areas; Georgetown site selection.	<p>NLC suggest that ERA should take advantage of drainage lines to provide variability (habitat diversity to attract fauna), rather than a homogenous habitat across the entire landform.</p> <ul style="list-style-type: none"> SSB will be establishing an additional two survey plots (<i>Eucalyptus tetrodonta</i> / <i>miniata</i> dominated) in the Georgetown area. NLC will be proposing consultation with TO's, with consideration of cultural perspectives (i.e. land management practices), for both existing and new sites. 	<p>ERA to provide maps (for both waste rock and non-waste rock areas) showing locations across the rehabilitated site where seasonally inundated savanna and riparian communities may be required.</p> <p>SSB to consult with NLC and ERA on Georgetown site selection and arrange for site visit to potential sites.</p> <p>SSB to provide ERA with feedback on the 2019 and 2020 nutrient cycling reports.</p>
11/02/21	Routine Periodic Inspection	SSB, DITT, NLC	Make Safe for Crushing Circuit, Mill and Processing area.	<p>Stakeholders explained that the purpose of the inspection was to understand the process of make safe activities for the processing plant and progress to date.</p> <p>J. Miller (SSB) noted that the authorisation still contains a requirement for periodic scrubber interlock testing. ERA should seek an exemption from DITT for this testing now that the extractions system will no longer be used to mitigate dust associated with crushing activities.</p> <p>M. Sandgren (SSB) noted that there was no place for radiation clearances or survey results to be recorded in the packs. D. Dumesny indicated that discussions with the Specialist Radiation Safety Advisor were underway to determine how radiation surveys and clearances would be conducted and recorded.</p>	ERA to provide stakeholders with updated information on how radiation clearances will be recorded in the decommissioning work packs.
08/02/21	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
05/02/21	Casual catch-up	SSB (KS)	Non-minuted	Non-minuted	Non-minuted
05/02/21	Casual catch-up	DITT (MS)	Non-minuted	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
02/02/21	Ecosystem Restoration Forum (ERF #4)	SSB/ERISS, NLC	Conceptual reference ecosystem (CRE) - Georgetown plots; disturbance in reference sites. Closure Criteria (CC) - Sustainability. ARRTC46 - joint workplan memo; presentations.	SSB will select new 1 ha sites within Georgetown area in consultation with ERA and NLC, with the aim to commence surveys ASAP. NLC indicated that Traditional Owner's would likely be interested in participating in the site selection process.	SSB will forward sustainability table to ERA to determine which aspects they're working on. SSB to send out presentation and associated shapefiles on disturbance assessment work, for review and potential follow up discussion. SSB to email NLC and GAC on provision of locations for cultural heritage sites to consider when selecting new Georgetown reference site locations.
28/01/21	RSWM Update Meeting #5	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Meeting to present on updated groundwater to surface water interaction in RSWM.	Non-minuted	Non-minuted
22/01/21	Pit 3 tailings consolidation	SSB (John Miller)	Pit 3 consolidation.	Non-minuted	Non-minuted
21/01/21	Routine Periodic Inspection	SSB, DITT, NLC	Surface water monitoring and release management.	Stakeholders noted a gully forming on the Pit 1 landform batter to the north-east of the CRS inlet channel. Sediment from the gully was observed within the Pit 1 perimeter drain with rock baffles appearing to contain the majority of the sediment. C. Brady (NLC) noted the presence of grasses at the revegetation trials at Stage 13.1 and that this strengthened the case for using herbicides during revegetation trials. RPI attendees noted that the potential risk to the offsite environment from herbicide application is low whilst no releases are occurring from targeted catchments.	SSB to respond to the report provided by ERA evaluating the risk posed by glyphosate to aquatic environments and provide ERA with guidance on expectations for further work on herbicide monitoring and investigations. ERA to provide stakeholders with an investigation report pertaining to the release of permeate before the diversion system was activated, noted in the routine Water Quality Report for 1-27 December 2020. ERA to update the Release Plan Calculator to include the Corridor Road Sump.
19/01/21	Ecosystem Restoration Forum (ERF #3)	SSB/ERISS, NLC	Conceptual reference ecosystem (CRE) Closure Criteria (CC)	SSB believes that the historical survey data used by ERA to develop CREv2 needs to be aggregated and possibly some new 1 ha plots implemented, to ensure that the data are comparable and scientifically defensible.	SSB and NLC to review and provide feedback on ERA draft memo addressing ARRTC questions.
07/01/21	Casual catch-up	SSB (MS)	Sediment monitoring at Pit 1 & Stage 13	Non-minuted	Non-minuted
07/01/21	Ecosystem Restoration Forum (ERF #2)	SSB/ERISS, NLC	Conceptual reference ecosystem (CRE) - plan Closure Criteria (CC) - plan	CRE: a) disturbance and implications for sites; b) species list; and c) implications for future monitoring Closure Criteria: a) review of quantitative parameters proposed by SSB at previous ARRTC meeting; b) benchmark criteria to actual closure criteria examples; c) sense check the closure criteria; and d) what does success look like?	Create memo with initial responses to ARRTC questions, including work plan. Indicate when each item will be addressed. Present progress on CRE, closure criteria and work plan to ARRTC at February meeting.
2021 ad-hoc	Meeting	ERA, GAC, Cth agencies	Discussions regarding amendments to the Atomic Energy Act	Non-minuted	Non-minuted
2021 ad-hoc	Verification site visits	SSB	Site visits to complete various closure verifications.	Non-minuted	Non-minuted
2021 weekly	Casual catch-up	ERA (SP) SSB (JM)	Non-minuted	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
18/12/20	RCCF	GAC, NLC, DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 3 consolidation model update Water model assumptions update HDS sludge disposal Pit 1 wet season preparations and CRS works update PFAS update <p>Solute transport update (source terms, solute transport and uncertainty analysis, SW/GW interactions)</p>	None minuted	<p>ERA to provide higher rainfall scenario schedule dates.</p> <p>ERA to provide MTC members with data from the PFAS preliminary investigation (as per the Ranger Authorisation Annex D.8).</p>
17/12/20	Routine Periodic Inspection	SSB, DITT, NLC	<ul style="list-style-type: none"> Audit follow-up and preparations for cessation of processing 	None minuted	None minuted
16/12/20	Pit 3 tailings consolidation	SSB (John Miller)	Pit 3 consolidation	Non-minuted	Non-minuted
16/12/20	RSWM Update Meeting #4	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Discussion on progress made to date on the model update. Discussion on proposed approach to implement an updated groundwater to surface water interaction following completion of INTERA GW/SW interaction study.	Non-minuted	Non-minuted
14/12/20	Casual catch-up	SSB (MS)	Sediment monitoring at Pit 1 & Stage 13	Non-minuted	Non-minuted
14/12/20	Ecosystem Restoration Forum (ERF #1)	SSB/ERISS, NLC	<p>Conceptual reference ecosystem (CRE) - Mattiske report; disturbance and reference sites/plots.</p> <p>Closure Criteria (CC)</p> <p>ARRTC Questions on Ecosystem Restoration</p>	<p>Key outcome: A plan of work that needs to be completed in the next 6 months.</p> <p>NLC is seeking clarification on how proposed ongoing monitoring of reference site will inform the ACRE (i.e. can an agreed reference ecosystem change over time?).</p> <p>ARRTC have raised questions on the impact of disturbance on the reference sites/ plots and whether 'impacted' sites should be included in developing the CRE.</p>	<p>ERA to review and respond to SSB comments on the proposed CREs</p> <p>ERA and SSB to work through data and methods used to derive ACRE V2 to reach agreement on the CRE</p> <p>SSB will undertake analysis of disturbance for all the reference sites and plots.</p> <p>ERA prepare a document that will contain the responses to all the ARRTC questions.</p> <p>All to consider purpose and frequency of monitoring of the reference sites</p>
11/12/20	Casual catch-up	NLC (CB)	Non-minuted	Non-minuted	Non-minuted
11/12/20	Weekly catch-up to end the year	SSB (JM, AL)	Non-minuted	Non-minuted	Non-minuted
04/12/20	Casual catch-up	SSB (KS)	Non-minuted	Non-minuted	Non-minuted
04/12/20	Casual catch-up	DITT (MS)	Non-minuted	Non-minuted	Non-minuted
02/12/20	RSWM Update Meeting #3	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Discussion on progress made to date on the model update. Presentation of groundwater model exfiltration maps following action in previous RSWM update meeting.	Non-minuted	Non-minuted
26/11/20	Casual catch-up	SSB	Review of ARRTC Ecosystem Restoration questions	Non-minuted	Non-minuted
20/11/20	Casual catch-up	NLC, SSB	Ecosystem reconstruction	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
20/11/20	RCCF	GAC, NLC DITT, SSB, DISER	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 wet season preparations and CRS works update End of milling and make safe activities Hydro mining update 2020 billabong sediment sampling program Pit 3 tailings studies update <p>Pit 1 trials update</p>	None minuted	<p>ERA to submit Erratum to Commonwealth and NT ministers, noting the typographical error in 2020 Mine Closure Plan regarding the maximum water level to be maintained in R3D vent shaft.. The vent shaft water level maximum should be -20 mAHD, not -25 mAHD.</p> <p>ERA to provide an estimated date of completion for the contaminated sites report/s.</p> <p>ERA to catch-up with SSB to discuss fine sediment monitoring/observations to be undertaken at CRS.</p> <p>ERA to add CRS water quality results to the Water Quality Reports and present results at future RCCFs.</p>
19-20/11/20	Routine Periodic Inspection	SSB, DITT, NLC	<ul style="list-style-type: none"> Pre-2020/21 wet season inspection of Jabiluka site. Progress of rehabilitation and general site condition. Completion of dry season work. 	Stakeholders noted the significant growth since the plant out in Stage 13.1A.	ERA to provide evidence that there is a system to ensure all statutory reports are submitted on time, e.g. Evidence of all statutory reporting deadlines entered into SAP.
18/11/20	RSWM Update Meeting #2	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Discussion on progress made to date on the model update and proposed approach to implement an updated groundwater to surface water interaction.	SSB requested during the meeting that maps are produced to visualise the groundwater model exfiltration locations and corresponding input nodes in the surface water model. Request was followed up by email from SSB on 23/10/2020.	ERA had INTERA develop maps using which were presented in follow up RSWM update meeting (2/12/2020) and provided to SSB with supporting documentation (18/12/20).
13/11/20	Casual catch-up	NLC	Non-minuted	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
9-11/11/20	ARRTC 45	ARRTC members & observers	<p>Ecosystem restoration trials (Stage 13.1 Pit 1) project update.</p> <p>Joint ERA/SSB project list and report.</p> <p>ARRTC report back to whole meeting on Chair's summary and discussion of Committee's views on KKN amendments and project close-outs.</p> <p>Project updates on:</p> <ul style="list-style-type: none"> Effects of surface and groundwater egress of mining-related solutes on stream ecological connectivity (WS7F). Ecohydrology and sensitivity of riparian flora (WS7H) Radon exhalation from waste rock on the Ranger trial landform (RAD3E). SSB update on BRUVnet technology for fish surveys. <p>Follow up discussion on groundwater session and outstanding question on surface water session of Water Workshop.</p> <p>KKN close-out WS3G and WS7G.</p> <p>Project close-out: Background COPC in groundwater (WS1A), ASS Conceptual Model (WS1A), natural World Heritage values (CT2A), restoration trajectories development (ESR5B).</p> <p>KKN amendment on LAN2A and LAN2B, and information for future KKN close out on LAN2B.</p> <p>KKN removal of LAN3E and WS8A.</p> <p>SSB's supervision, assessment and monitoring activities.</p> <p>Reports from NLC, DITT, Environment NGO.</p> <p>Post meeting discussions on closeout application for KKN WS7c.</p>	<p>Prof Craig Simmons noted ARRTC had several questions and concerns regarding aspects of the trials and will instigate a process to ensure concerns and ideas are provided to ERA.</p> <p>To minimise resourcing required for reporting, ARRTC agreed that the ERA and SSB reports could be provided on an annual basis at each November meeting, coinciding with the production of ERA's RMCP and SSB's Annual Technical Report.</p> <p>Prof Simmons acknowledged the volume and quality of work undertaken by ERA and SSB in preparing reports and presenting to the Committee. Where possible, ARRTC leads will work with SSB and ERA offline and make recommendations to the Committee to close-out more KKNs in between meetings.</p> <p>ARRTC were interested in a field trip to Ranger in May. ERA advised that workarounds, such as the use of drone footage or virtual tours, might be possible if there are still COVID restrictions around travel.</p>	<p>ERA to populate a matrix of logistical and technical constraints for species proposed for vegetation establishment, based on advice to be provided by ARRTC on which species-specific characteristics should to be listed in the matrix.</p> <p>SSB to coordinate an Ecosystem Restoration workshop before the next ARRTC meeting.</p> <p>ERA to provide Lindsay Hutley for the NESP riparian vegetation sensitivity project: (i) appropriate groundwater solute modelling results, and (ii) selection of exposed locations onsite for assessing field effects of magnesium sulfate on vegetation.</p> <p>ERA to ensure that the re-charge rate in the uncertainty analysis in the ground water model (produced by INTERA) covers the likely extreme wet and extreme dry re-charge scenarios.</p> <p>ERA to provide quantitative evidence that preferential flow paths are not material to the result of the groundwater model.</p> <p>ARRTC to provide feedback on the scope of ERA's Phase 3 surface water modelling work by 20 Nov, noting that the report was uploaded to GovTEAMS during ARRTC45 and ERA are rapidly moving to execution.</p> <p>SSB to provide sulfate closure criteria information (including Darren Baldwin reports) to ARRTC.</p> <p>ARRTC to provide feedback on the climate change risk assessment report provided by ERA during ARRTC45.</p> <p>SSB to provide update to ARRTC on how environmental monitoring data collected from other sites in Alligator Rivers Region are assessed.</p> <p>ERA to provide ARRTC with information on next steps associated with assessment of ASS risks on Ranger site.</p> <p>SSB and ERA to convene a workshop on Ecosystem Restoration before the Feb 2021 ARRTC meeting.</p> <p>Dr. Libby Rumpff to collate ARRTC concerns prior to the Ecosystem Restoration workshop.</p>
05/11/20	RSWM Update Meeting #1	ERA (DS, EF), Water Solutions, SSB (AL), Water Technology, IGS	Initial meeting to present and discuss scope for RSWM model update.	Non-minuted	Non-minuted
29/10/20	Casual catch-up	SSB (MS, JL), Rio Tinto	Landform Evolution Model	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23/10/20	RCCF	SSB, DISER, DITT, GAC, NLC	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 wet season preparation and CRS works TSF wall and floor cleaning Geotechnical investigations in Pit 3 Pit 1 tailings settlement monitoring BC upgrade Pit 3 underdrain bore Billabong surveys Sediment monitoring preparations <p>SSB presented on:</p> <ul style="list-style-type: none"> Stage 13 sediment movement investigation Turbidity assessment Summary of ERA/SSB discussion on emerging contaminants and nutrients <p>KKN close out discussion.</p>	None minuted	<p>ERA to organise TSF wall cleaning inspection for DITT.</p> <p>ERA to reinstate Pit 1 decants by the end of November 2020.</p>
22/10/20	Water & Sediment Workshop	ARRTC members & observers	Intera and Water Solution presentation of solute transport modelling.	Feedback on modelling to date	Ongoing progress of the modelling projects
21/10/20	GW Model – Uncertainty Analysis Meeting #8	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #8 to discuss progress on post closure solute transport modelling with uncertainty analysis. Present preliminary results from uncertainty analysis groundwater modelling.	Non-minuted	Non-minuted
20/10/20	Casual catch-up	Parks Australia	<p>Parks Australia permit discussions, for field preparations including:</p> <ul style="list-style-type: none"> Bushtucker (fauna) <p>Billabong sediment sampling</p>	Non-minuted	Non-minuted
19/10/20	Hazard Assessment	SSB	<ul style="list-style-type: none"> Emerging contaminants hazard assessment. 	None minuted	None minuted
19/10/20	Casual catch-up	SSB, 2rog Consulting	SSB presented on the proposed changes to the approach for assessing turbidity for Ranger minesite closure.	Non-minuted	Non-minuted
19/10/20	Pit 1 Revegetation Discussion (#2)	SSB, NLC	<p>Discussion on the proposed revegetation research trials for Pit 1 – monitoring.</p> <p>Discussion on detail provided, developing monitoring schedules, nutrient and soil monitoring, and possible collaborative monitoring.</p>	Non-minuted	Non-minuted
16/10/20	Pit 3 tailings consolidation	SSB (John Miller)	Pit 3 consolidation.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
15/10/20	Routine Periodic Inspection	SSB, DITT, NLC	Crushing circuit, mill and processing area: <ul style="list-style-type: none"> Preparation for shutdown Improvements and initiatives Scrubber interlock testing Bulk ammonia storage status Uranium stack emissions results Incident 01/10/20: Browsing Ant (Lepisiota frauenfeldi) update. Pit 3 CPT progress. Pit 1 water diversion system construction.	Stakeholders noted that if scrubbers and ventilation systems were used during the make safe period, as equipment and ducting are cleaned, there may be the requirement to monitor Uranium stack emissions past the cessation of processing. This should be considered as part of the make safe work program.	ERA to provide hazardous material disposal plan updated to reflect management following cessation of processing.
13/10/20	Pit 1 Revegetation Discussion (#1)	SSB, NLC	Discussion on the proposed revegetation research trials for Pit 1 – set up Discussion on direct seeding methods, water crystals, Bracke planting device, fertilisation and water risks, how results will be used to determine final method.	Non-minuted	Non-minuted
09/10/20	MTC	DITT, SSB	DITT proposed a merger of MMP and MCP and aim to update the Authorisation in Q1 2021. ERA provided updates on: <ul style="list-style-type: none"> Environmental incidents and environmental audit Application updates Pit 1 and Stage 13 revegetation updates and issues Browsing ants incidents summary Pit 1 wet season preparation reporting and the interim Pit 1 release system updates Pit 3 application planned in December 2020 Members provided summary of acid tank incident inspection on request from ERA. COVID-19 restriction updates.	GAC does not support changing of the Authorisation and wants to wait until the Section 41 Authority of the Atomic Energy Act is amended and a review of the Working Arrangements is completed. SSB is satisfied with incident report, action closed. ERA agreed that that Peter Wilkinson from Noetic would meet with SSB after each oversight visit. MTC members question about the potential for impacts on Georgetown Billabong due to sediment deposition and how the sluice gates shall operate if a trigger-value is met. ERA advised the risk mitigation mechanism. SSB advised that the Pit 3 application will need to specifically address surface water/groundwater interactions work and the integration of the groundwater model and the surface water model. Projects and/or KKNs relevant to the Pit 3 application will need to be closed out by ARRTC prior to SSB endorsing the application.	ERA to send through S29 regarding brown browsing ant. ERA to send indicative information regarding drilling scope of works.
02/10/20	Pit 3 tailings consolidation	SSB (JM)	Non-minuted	Non-minuted	Non-minuted
29/09/20	WASWG	SSB, DPIR, Rio Tinto, NLC	Item discussed: <ul style="list-style-type: none"> ARRTC planning Water and sediment studies to inform Pit 3 application.	Kath Smith requested that material be provided to ARRTC 3 weeks ahead of meeting.	Pass on science information to MTC for consideration of approach to closure criteria for nutrients. ERA to provide information to SSB on source for emerging contaminants ERA-SSB work together to complete KKN close-out for emerging contaminants. Chris H to provide information on method for turbidity closure criteria assessment.
21-25/09/20	Authorisation Audit	SSB, DITT, NLC	<ul style="list-style-type: none"> Audit of transition to closure 	Audit report	Actions tracked through RPI

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
18/09/20	Pit 3 tailings consolidation	SSB (JM)	Non-minuted	Non-minuted	Non-minuted
17/09/20	ARRAC 54	ARRAC members & observers	<p>ERA presented an overview of the company's operational performance, health and safety, process safety, environmental performance, water management, progressive rehabilitation and studies and approvals for the reporting period including:</p> <ul style="list-style-type: none"> Pit 1 backfill completion Revegetation status updates on Pit 1 and Stage 13 Groundwater model studies progressing, background COPC updated Surface water model results provided to stakeholders Bushtucker project with flora samples taken and draft report completed Conceptual mode for ASS completed Contaminated site drilling program undertaken <p>Approval status updates</p>	None minuted	ERA to provide SSB with updated rehabilitation schedules to be incorporated into future SSB ARRAC reports.
11/09/20	Pit 1 sediment monitoring	SSB, NLC	<ul style="list-style-type: none"> Discussion on proposed sediment monitoring at Pit 1. 	Non-minuted	Non-minuted
04/09/20	GW Model – Uncertainty Analysis Meeting #7	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #7 to discuss progress on post closure solute transport modelling with uncertainty analysis. Review finalised source terms, discussion on approach for updating groundwater to surface water interaction and discussion on uncertainty analysis progress.	Non-minuted	Non-minuted
04/09/20	Pit 3 tailings consolidation	SSB (JM)	Pit 3 consolidation.	Non-minuted	Non-minuted
26/08/20	Casual catch-up	SSB (AL)	To discuss Pit 1 sump/drainage in preparation for sediment monitoring works.	Non-minuted	Non-minuted
25/08/20	WASWG	SSB, NLC, Rio Tinto, DPIR	<p>Items discussed:</p> <ul style="list-style-type: none"> ASS sampling plan Nutrient update Closure criteria <p>Pit 3 application relevant projects</p>	Non-minuted	Non-minuted
21/08/20	RCCF	SSB, DPIR, GAC, NLC, DIIS	<p>ERA provided updates on:</p> <ul style="list-style-type: none"> Monthly metrics and monitoring Pit 1 consolidation ongoing monitoring program implementation TSF Notch Underdrain bore ASS conceptual model 	None minuted	<p>ERA to communicate program objectives and activities when scoped and approved for Magela Creek Sand Investigation.</p> <p>ERA to provide stakeholders with the North Ramp 2 Report by Coffey and use of the amphibious excavator.</p> <p>ERA to add approvals tracker to future RCCF slide packs.</p> <p>ERA to add a more suitable Pit 1 pore water metric slide for future RCCFs.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
20/08/20	Routine Periodic Inspection	SSB, DITT, NLC	<ul style="list-style-type: none"> Revegetation and ecosystem restoration preparation, groundwater monitoring and management and contaminated sites. 	<p>Stakeholders discussed the behaviour of surface water infiltration into the new Pit 1 landform and how that water might be monitored and managed.</p> <p>Stakeholders discussed the current status and intended future use of the turbo misters. They are not currently being used. ERA is seeking further information about their performance and approval will be sought before they are operated.</p> <p>Stakeholders discussed whether closure aspects were included in the scope of work for ERM to review of the performance of the GCT2 interception system.</p>	<p>ERA to document their seed collection and management procedures and strategies. ERA to provide the procedures to stakeholders for review.</p> <p>ERA to provide a draft of the integrated management strategy for Pit 1.</p> <p>SSB to organise a meeting time for presentations which were postponed at the August RPI.</p> <p>ERA to add the Pit 3 temporary laydown area to the contaminated sites register.</p> <p>ERA to update stakeholders on how teams at ERA are integrating contaminated site knowledge and data and how data from the contaminated sites assessments are incorporated into the contaminated site register.</p>
13/08/20	Background COPC project	ERA (DS), SSB (AL)	Follow up on the study recommendations and future monitoring requirements identified in Background COPC study.	Non-minuted	Non-minuted
07/08/20	ARRTC mid-term briefing	ARRTC members & observers	<p>SSB provided sediment and sediment contaminant information on U and sulfate.</p> <p>ERA provided updates on regular INTERA/IGS meetings on groundwater uncertainty analysis.</p> <p>Discussion on nutrient assessment and corresponding KKN close-outs.</p> <p>Updates on ecosystem restoration trajectories, world heritage values.</p>	Non-minuted	Non-minuted
31/07/20	GW Model – Uncertainty Analysis Meeting #6	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #6 to discuss progress on post closure solute transport modelling with uncertainty analysis. Review progress on source term data analysis and discussion on uncertainty analysis progress.	Non-minuted	Non-minuted
28/07/20	WASWG	NLC, SSB, DPIR, Rio Tinto, GAC	<p>Presentation on tiered risk assessment approach provided by Chris Humphrey, risk is negligible from nitrate and phosphate and low for ammonia.</p> <p>Discussion of whether numeric closure criteria required or to rule out need for criteria based on risk assessment.</p> <p>SSB provided update on review of U partitioning paper and discussions with ARRTC members on the need for sediment closure criteria.</p>	None minuted	<p>ERA to review SWM report to assess how modelled recession/below sill level periods align with assumptions used in risk assessment</p> <p>ERA to look into the SWM to explore the assumptions around the biological, chemical and physical processes that underlie the modelled outputs.</p> <p>SSB and ERA to look into knowledge needs/model improvement to assess if Gulungul billabong will act as a sink for nutrients.</p> <p>ERA to send paper on local U Kd values to Andrew Harford.</p> <p>ERA to follow up with BMT for feedback on Mg additional lines of evidence memo. ASAP so issues can be reviewed ahead of the upcoming ARRTC meeting.</p>
24/07/20	Pit 3 tailings consolidation	SSB (JM)	Pit 3 consolidation	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23/07/20	Routine Periodic Inspection	SSB, DITT, NLC	Hydrocarbons, and waste management. Water treatment and management.	Stakeholders noted a general improvement in process safety since last month, as COVID-19-related restrictions have eased and allowed issues to be resolved. Stakeholders discussed the potential for recycling materials from onsite. ERA advised that it the radiation clearances required would be prohibitively onerous.	None minuted
17/07/20	RCCF	SSB, DPIR, NLC, DIIS, GAC	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring Seed harvest ERA closure personnel resourcing Pit 1 revegetation World Heritage values SSB provided supporting lines of evidence for the Mg rehabilitation standard.	None minuted	ERA to prepare a plan for stopping the decant pumps in Pit 1 once 95% consolidation has been achieved including the ongoing monitoring program to be implemented and presented to stakeholders in the August RCCF. Send ERA State and Transition Model scope of work to SSB for review. Pit 1 revegetation and ripping trials plan to be finalised and distributed to stakeholders. Present Acid Sulfate Soil Conceptual Model at the August RCCF.
16/07/20	Casual catch-up	Djurrubu Rangers	Discussed bushtucker (fauna) project and Djurrubu Rangers' involvement.	Non-minuted	Non-minuted
10/07/20	Pit 3 tailings consolidation	SSB (JM)	Pit 3 consolidation.	Non-minuted	Non-minuted
26/06/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
25/06/20	GW catch-up	ERA (DS, AN), SSB (AL)	General catch-up on groundwater related on operational reporting and closure studies underway at ERA.	Non-minuted	Non-minuted
25/06/20	KKN Projects	SSB	KKN Projects Close-out timelines	Non-minuted	Non-minuted
19/06/20	GW Model – Uncertainty Analysis Meeting #5	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #5 to discuss progress on post closure solute transport modelling with uncertainty analysis. Review progress on source term data analysis and discuss modifications to HLU extents following review of parameter data.	Non-minuted	Non-minuted
19/06/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
18/06/20	MERRG	SSB	Non-minuted	Non-minuted	Non-minuted
16/06/20	GW catch-up	ERA (DS), SSB (AL)	General catch-up and follow up on ARRTC #44 action 44.4	Non-minuted	Non-minuted
15/06/20	Closure criteria	SSB	Non-minuted	Non-minuted	Non-minuted
12/06/20	Pit 3 tailings consolidation	SSB (JM)	Pit 3 consolidation	Non-minuted	Non-minuted
12/06/20	Casual catch-up	SSB (KT), ERISS (KS)	Non-minuted	Non-minuted	Non-minuted
05/06/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
02/06/20	WASWG	Rio Tinto, SSB, DPIR	Item discussed: <ul style="list-style-type: none"> Action tracker Pit 3 application contents agreed	Reiteration that actions to complete closure criteria is the highest priority.	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
29/05/20	Pit 3 tailings consolidation	SSB (JM)	<ul style="list-style-type: none"> Pit 3 consolidation 	Non-minuted	Non-minuted
29/05/20	RCCF	GAC, NLC, DPIR, SSB	ERA provided updates on: <ul style="list-style-type: none"> Monthly metrics and monitoring Wet season update Radon exhalation at the TLF Ranger closure radiological impact assessment update Surface water model updates Process water balance: pore water in tailings vs free water above tailings Closure studies monitoring program PFAS SAQP updates Stage 13 preliminary vegetation survival Ecosystem Working group	None minuted	Follow up meeting required to discuss pore water versus free water and decide on the best metric to use. ERA to communicate program objectives and activities when scoped and approved. Consider the collection of bone during the fauna sampling project in addition to organs and flesh.
29/05/20	Casual catch-up	SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
26/05/20	ERWG update for individuals that missed previous meeting	ERWG member, Rio Tinto	Preliminary Pit 1 Revegetation Plan	Non-minuted	Follow-up meeting scheduled.
22/05/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
20/05/20	MTC	MTC members	ERA provided updates on: <ul style="list-style-type: none"> Applications Pit 3 commitments Stage 13 revegetation trial update Weed control MCP progress update The committee discussed: <ul style="list-style-type: none"> Ranger Authorisation 0108-18 variation Annual water management plan and groundwater monitoring plan Tailings removal Infrastructure maintenance and inspection regime Radiation team resources Calciner and Product Packing Stack emission testing Funding issue	The MTC is ok with ERA using the new guidelines provided this is approved by the Ministers. GAC and NLC considers environmental protection of the Alligator Rivers Region a Commonwealth responsibility. DPIR considers funding of the SSB a Commonwealth responsibility.	DPIR to provide draft Authorisation and make available for Stakeholder review with a target of 29 May 2020. DPIR to arrange a forum for discussion on the proposed draft of the authorisation prior to 30th June (~15th June). ERA to provide a plan by July, with ERA arrange a workshop with stakeholders by end of July, to discuss how ERA are going to comply with the Environmental Requirements to remove tailings from TSF and place into Pit 3.
18/05/20	Brine Squeezer [Process Water] post-submission meeting	SSB, GAC, DISER	<ul style="list-style-type: none"> Q&A following submission of application. 	Concerns for minor technical clarifications re permeate quality, pH, Mn, bunding and pilot trial. Emphasised need to apply bunding for controlled process water during trials as well as during full-scale operation.	ERA to provide data comparison of BS process permeate with WTP brine permeate.
18/05/20	Discussion regarding ERWG	SSB, NLC	The purpose of the ERWG and plans going forward	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
15/05/20	TLF Monitoring Plan	SSB	TLF Monitoring Plan (MERRG)	Non-minuted	Non-minuted
15/05/20	Pit 3 tailings consolidation	SSB	Pit 3 consolidation	Non-minuted	Non-minuted
15/05/20	Casual catch-up	SSB (KT), ERISS (KS)	Non-minuted	Non-minuted	Non-minuted
14/05/20	Water Management Reporting Structure	ERA (DS, AN, SP, DS), SSB (KT, AL, KT), DITT (MS, RV), NLC, GAC	Meeting to discuss and agree on changes to Water Management reporting and data requirements as Ranger transitions into closure.	<p><i>“To address these issues, we ask that ERA provide a table detailing all recommendations and closure considerations identified in the 2018/19 AGWR and include information on whether any associated work or additional monitoring will be undertaken. This table will be useful to help link the 2018/19 AGWR to relevant sections of the 2019/20 Groundwater Monitoring Plan. To avoid these issues in the future, we encourage ERA to consider submitting the Groundwater Monitoring Plan as a stand-alone document, ensuring it more effectively covers both operational and closure matters as required under the Authorisation.”</i></p> <p>Letter from SSB to DPIR 14/4/20</p>	<p>Proposed change timing of Water Management report submissions to stakeholders to allow findings of reports to be included in management and monitoring plans.</p> <p>Proposed creation of a standalone monitoring plan, Ranger Water Monitoring Strategy, to include both surface water and groundwater monitoring to meet operational and closure requirements.</p>
12-13/05/20	ARRTC 44	ARRTC members & observers	<p>ERA and SSB provided updates on:</p> <ul style="list-style-type: none"> Joint project list and report on schedule RMCP SSB's assessment report and KKN close-outs SSB's initial conceptual reference ecosystem & development of its Standard and assessment methods ERA's developments towards agreed conceptual reference ecosystem and closure criteria ERA report on closure criteria, vulnerability assessment and sulfate mapping ERA report on ground and surface water modelling SSB report on its Standards, emerging COPCs, mixtures, CERA2 <p>Stakeholder updates</p>	None minuted	None minuted
11/05/20	ERA faunal study	GAC, NLC	<ul style="list-style-type: none"> ERA faunal study and approvals required 	Non-minuted	Non-minuted
08/05/20	GW Model – Uncertainty Analysis Meeting #4	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #4 to discuss progress on post closure solute transport modelling with uncertainty analysis. Review of additional parameter data, discussion on uncertainty analysis progress and present initial source term data analysis.	Non-minuted	Non-minuted
08/05/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
05/05/20	WASWG	NLC, Rio Tinto, GAC, DPIR, SSB	<p>Review minutes from last meeting</p> <p>Discuss the ERA-SSB joint project list for ARRTC</p> <p>Upcoming applications</p>	None minuted	<p>Advise of any changes to closure criteria table summarising actions and agreements by 8/4/2020.</p> <p>Review ERA response to water and sediment questions on the TSF floor application, which will be re-submitted mid-May.</p> <p>Chris Brady to discuss priorities for WASWG re Pit 3 application with Sharon Paulka and Keith Tayler and develop table by next meeting.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
05/05/20	ERWG	ERWG members	Pit 1 revegetation trials	Non-minuted	Non-minuted
01/05/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
30/04/20	MERRG	SSB	Regular catch-up	Non-minuted	Non-minuted
30/04/20	Casual catch-up	SSB (AL)	SW Uncertainty analysis	Non-minuted	Non-minuted
24/04/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
23/04/20	Brine Squeezer [Process water] stakeholder update	DPIR, DISER, NLC, ERISS, SSB	Update following risk workshop	None minuted	Planned submission for end of April. Planning for post-submission meeting within two weeks.
20/04/20	MERRG	SSB	Regular catch-up	Non-minuted	Non-minuted
17/04/20	RCCF	SSB, DPIR, GAC	Item discussed: <ul style="list-style-type: none"> Rehabilitation standards update for water & sediment and landform Wet season update Covid-19 impacts on 2020 dry season projects Water model update Pit 3 underdrain bore and brine injection update Stage 13 revegetation update GW & SW modelling update Working group update	None minuted	ERA to come back with suggestions on what is the best Fugro survey and/or tailings monitoring program to inform environmental studies and the engineering for Pit 1.
17/04/20	Casual catch-up	SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
16/04/20	GW catch-up	ERA (DS, AN, MD), SSB (AL)	General catch-up on groundwater related operation report and closure studies underway at ERA.	Non-minuted	Non-minuted
16/04/20	North Notch 3 stakeholder meeting	SSB, NLC, DPIR	Post-submission briefing on the North Notch 3 application (submitted to stakeholders 2 weeks earlier)	None minuted	Stakeholders – continued with review of application ERA – no action
10/04/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
08/04/20	Brine Squeezer stakeholder meeting	DPIR, DISER, NLC, ERISS, SSB	Introduce application for Brine Squeezer process water treatment.	No major issues expressed. Reiterated concerned with failure and risk to environment. Interested in outcomes of the planned risk assessment. Suggested an update meeting post-risk assessment.	Continue to progress with risk assessment. Plan an update meeting for stakeholders post risk assessment.
08/04/20	WASWG	NLC, Rio Tinto, SSB, GAC, DPIR	Item discussed: <ul style="list-style-type: none"> Closure Criteria ALARA Project tracking	None minuted	Chris Brady to draft short statement for content that need to be provided to ARRTC. ERA to send out action tracking sheet weekly.
03/04/20	Casual catch-up	SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
27/03/20	GW Model – Uncertainty Analysis Meeting #3	ERA (DS), INTERA, SSB (AL), IGS (GH, TL)	Meeting #3 to discuss progress on post closure solute transport modelling with uncertainty analysis. Discussion on model parameter prior probability density functions.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
20/03/20	RCCF	SSB, GAC, DPIR, NLC, DIIS	<p>Item discussed:</p> <ul style="list-style-type: none"> SSB presented initial conceptual reference ecosystem and proposed methods for assessing revegetation success Pit 3 underdrain bore update Tailings update, including Pit 3deposition plan, progress, geophysical survey, consolidation model sensitivity analysis, Pit 1consolidation model outcome, and result from Q3 2019 tailing characterisation. Pit 3 process water update TSF Floor Groundwater and surface water model updates Revegetation update for Stage 13 trial and ERA conceptual reference ecosystem <p>Working group updates</p>	None minuted	ERA to provide suggestion to decide the best survey/ monitoring program input into environmental studies for Pit 1.
20/03/20	Casual catch-up	SSB (KT)	<ul style="list-style-type: none"> Non-minuted 	Non-minuted	Non-minuted
17/03/20	KNPS contract model	Kakadu Native Plants	KNPs presented with new contract model for approval.	None minuted	Greg Williamson to liaise with Peter Christopherson

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
13/03/20	MTC	MTC members	<ul style="list-style-type: none"> ERA presented incident report and Pit 1 pond incident update. Discussion for expected 2020 application and progresses towards them. Pit 3 contaminated waste disposal area investigation progress: Additional monitoring bore has been drilled (P3_05) and increased monitoring frequency of existing bores. ERA provide updates on Pit 3 underdrain bore and weed control. ERA provide short update on Pit 3 deposition progress (Fugro geophysical survey), Pit 3 consolidation model sensitivity analysis, Pit 1 independent tailings consolidation modelling, findings from Q3 2019 in-situ tailings characterisation and tailings consolidation modelling. MCP update. PFAS risk on RPA and Jabiru Airport contaminated site survey. Ranger Authorisation 0108 amendment MCP and MMP relationship discussion	SSB agree with the continued use of the Pit 3 waste disposal site providing it is remediated at closure. The committee agreed that there will be increasing commonality between the MMP and the MCP.	ERA to draft a letter re R3D water levels. DPIR to clarify the process for reporting a notifiable breach. ERA to: <ul style="list-style-type: none"> Forward on investigation report and additional water management to the RWMP (resubmit update on 16th March). Review implementation of commitments in the RWMP scheduled for May 2020 MTC. Finalise TSF deconstruction application by 20th March Submit North notch 2 application by 20th March. Provide water quality data on brine squeezer next reporting submission. Update the progress of the underdrain bore refurbishment by end of March/early April. SSB to undertake Spigelia weed assessment training. ERA to submit Pit 3 deposition plan, Pit 3 OMM, Fugro survey report, NGI report and CPT report by the end of March. ERA to provide current contaminated site register for airport and develop SAQP for PFAS at the airport. DPIR to review the authorisation in consultation with MTC members. ERA to provide update on the audit actions in the next RPI.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
12/03/20	WASWG	SSB, NLC, GAC, DPIR, ERM, BMT	<ul style="list-style-type: none"> Updates on ASS conceptual model (ERM) GW background COPC concentration (ERM) Aquatic ecosystem vulnerability to magnesium KKN close out ALARA overview by ERA Monitoring needs and plan on aquatic ecosystem 	<ul style="list-style-type: none"> SSB expect the ASS risks to be addressed in the Pit 3 application. <p>SSB concerned about the water quality in sulfate concentration approaching guideline value of 10 mg/L.</p>	<p>ERA to:</p> <ul style="list-style-type: none"> develop road map showing how achievement of primary and secondary environmental requirements can be demonstrated provide BPT results distribute ecosystem vulnerability to Mg report to stakeholders by end of April with and without costing scored when water bodies and riparian zones are being considered distribute ALARA paper to stakeholders by end of March schedule workshop to redo the vulnerability assessment <p>SSB to discuss ALARA with GAC</p> <p>ERA and SSB to review the plans for ASS monitoring when the ASS model report is available.</p> <p>ERM to include discussion of implications of choosing univariate versus multivariate analysis.</p> <p>SSB to ask GAC for input to monitoring aims (cultural criteria)</p>
11/03/20	Climate change meeting	SSB, Kakadu Parks, GAC, NLC, DPIR	<p>Item discussed:</p> <ul style="list-style-type: none"> Mine Closure risk screening SME model scenarios Recommendations for risk mitigation 	<ul style="list-style-type: none"> Non-minuted 	Non-minuted
10/03/20	Stakeholder business update	Jabiru Area School personnel	<ul style="list-style-type: none"> Present an update on key events relating to ERA's operations. This forum is a good opportunity to raise any questions or concerns you have about ERA's operations and the future of Jabiru. 	Non-minuted	Non-minuted
05/03/20	Stakeholder business update	West Arnhem Regional Council personnel	Present an update on key events relating to ERA's operations. This forum is a good opportunity to raise any questions or concerns you have about ERA's operations and the future of Jabiru.	Non-minuted	Non-minuted
05/03/20	Stakeholder business update	Local businesses/organisations	Present an update on key events relating to ERA's operations. This forum is a good opportunity to raise any questions or concerns you have about ERA's operations and the future of Jabiru.	Non-minuted	Non-minuted
04/03/20	Introduction to Kakadu Native Plant Services	Kakadu Native Plants	Jacque new to the business required intro and update of KNPs	Formalise future presentation on Ranger rehabilitation/revegetation	None minuted
28/02/20	Volunteer drivers for youth program	Red Lily Public Health	Discussed opportunities around ERA volunteer drivers for Youth program	Non-minuted	Non-minuted
27/02/20	Stakeholder business update	Jabiru Health Centre and Red Lily Public Health Program personnel	Present an update on key events relating to ERA's operations. This forum is a good opportunity to raise any questions or concerns you have about ERA's operations and the future of Jabiru.	None minuted	Include photo timeline of Pit 1 at the SBU scheduled in the second half of the year

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
21/02/20	Casual catch-up	SSB (KT)	Non-minuted	Non-minuted	Non-minuted
18/02/20	ERA closure and rehabilitation vendor forum	90 suppliers in the NT and wider	Shared information with suppliers of the complexity of rehabilitation activities and seeking their held in solving some of the challenges and bring innovative solutions within a budget and a tight deadline	None minuted	None minuted
12/02/20	Pit 1 GW monitoring workshop	ERA (DS, AN, CN), SSB (AL, KT, CH, RB), IGS (GH)	Meeting to discuss groundwater monitoring aspects for Pit 1 to ensure monitoring meets all objectives.	Any new groundwater bores should align with existing ecosystem vegetation monitoring, unlikely an opportunity to monitor GW/SW interactions from Pit 1 landform, review of pit 1 groundwater monitoring required to ensure monitoring network adequately delineates any plumes, consider how groundwater WQ data could be used to test/validate groundwater model and removal of any existing bores tied to approvals need to go through further regulatory process outside of RWMP/GMP.	None minuted
10/02/20	Safety aspects at the nursery	Kakadu Native Plants	Discussed implementation of safety aspects at the Nursery - monitoring cameras, cyclone action plan, muster point maps, tags for first aid kits and fire extinguishers	None minuted	Provide feedback to Peter regarding the safety aspects discussed at the meeting.
07/02/20	GW Model Uncertainty Analysis Meeting #2	ERA (DS, CN), INTERA, SSB (AL), IGS (GH, TL)	Meeting #2 to discuss progress on post closure solute transport modelling with uncertainty analysis. Discussion on data review and development of prior probability density functions.	Non-minuted	Non-minuted
06/02/20	ERA standard operating procedures	Kakadu Native Plants	Initial meeting to clarify safety documents to be provided to KNPS including implementation of safety equipment at the Nursery	None minuted	Provide list of standard operating procedures, policies and CRM sheets. Organise meeting with ER Supervisor to look at safety equipment.
05/02/20	GW catch-up	ERA (DS, SV, AN), SSB (AL)	General catch-up on groundwater related on operational reporting and closure studies underway at ERA.	Non-minuted	Non-minuted
05/02/20	Business development & safety	Kakadu Native Plants	Brief meeting with KNPs to discuss contracts	None minuted	To ensure procurement team meet with KNPS to discuss contract options
30/01/20	TSF Sub-floor stakeholder engagement	DIIS, NLC/GAC, SSB, DPIR	Provide technical updates re drilling, GW/SW modelling and outcomes of BPT and risk assessment. Confirm format (i.e. notification v application).	Agreed formal application required as linked with TSF deconstruction which is of interest to CWTH. Interested in model assumptions. Difficult to recommend in absence of detail on contamination.	Planned submission in February 2020.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
29/01/20	WASWG	GAC, SSB, DPIR	<p>Vanadium as a COPC with all available data provided by SSB and ERA.</p> <p>Use TLF data to update the SS simulation in SW model.</p> <p>Update and ERM project.</p> <p>SSB projects:</p> <ul style="list-style-type: none"> Billabong sediment sampling results were provided and will be assessed by Darren Baldwin. Billabong sedimentation rates investigated Cr6+ identified as a possible concern in surface water post closure ion <p>Choice of sediment COPC</p>	ERA commented on how to exclude impacts from disturbance (pig, buffalo etc) from sedimentation measurement methods chosen.	<p>Paul Brown to review Melanie Trenfields's (SSB) speciation modelling work</p> <p>ERA to:</p> <ul style="list-style-type: none"> arrange ERM to present work at March WASWG circulate conceptual models to WASWG group send through sump and wetland vegetation observational data reports from Kyla Valdron Clark to SSB provide additional info about bushtucker project to WASWG <p>SSB to:</p> <ul style="list-style-type: none"> set up meeting to revisit billabong sediment sampling program. provide draft/technical memo to ERA to help guide their planning day provide update on findings at next meeting. set up formal meeting further discussion <p>send draft review of world heritage values on the RPA to WASWG</p>
29/01/20	Business development in Jabiru	GAC	Discuss opportunity for partnership in business dev officer role	Non-minuted	<ul style="list-style-type: none"> Non-minuted
24/01/20	RCCF	SSB, GAC, DPIR, NLC, DIIS	<p>Item discussed:</p> <ul style="list-style-type: none"> Contaminated sites and drilling program Closure drilling program Groundwater/surface water studies TSF updates Rehabilitation and Ecology updates: Conceptual reference ecosystem, completion criteria and Stage 13 revegetation trial. <p>Working group updates</p>	Need to demonstrate Stage 13 irrigation can be supplied onsite and will not be impacted by HDS plant's input into water circle.	<p>SSB and ERA to discuss whether aquatic sediment sampling scope needs to be redefined.</p> <p>Provide WABSI Framework to DPIR.ERA to provide 2org report to SSB.</p> <p>ERA to include DPIR into WASWG and MERRG.</p>
23/01/20	Discuss business development	Trade & Innovation Anne Pearce	<ul style="list-style-type: none"> Discuss business development officer role 	Non-minuted	Determine NTG's appetite for partnership
22/01/20	GW/SW model interaction meeting	ERA (DS, SP, CN), INTERA, Water Solutions, SSB (AL, KT), Water Technology, IGS	This meeting is to discuss the concerns raised in the letter sent to ERA by SSB on the 18th December, overview of the projects in place to inform the interaction conceptualisation and to agree on a plan forward.	SSB expanded on concerns identified in letter dated 18 th December 2019. Discussion around SW model calibration process including lack of downstream calibration due to mine influence and low confidence in GW/SW interaction as not based on observational data.	<p>ERA to undertake study to develop a scientifically sound and robust GW/SW interaction conceptualisation, using site specific data for incorporating post closure GW modelling COPC loads into SW model.</p> <p>ERA to undertake update to SW model to include downstream, miner operational period calibration.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
19/12/19	SW Model Meeting	ERA (DS, CN, SP), SSB (AL, KT, JM)	Discussion on the model calibration methodology and approach for integrating the post closure groundwater loads to the surface water model. Meeting to clarify comments made in letter from SSB to ERA (SP) on 18 th Dec 2019 and develop a plan to address.	<i>The SSB considers that integration between the groundwater and surface water models is critical in providing confidence the model is fit for purpose and capable of accurately predicting contaminant loads into the future. We believe the information provided to date does not provide confidence that the level of integration required has been met at this phase of the modelling, therefore we seek further clarification on the technical details.</i> Extract from letter to ERA dated 18 th December 2019	ERA to organise meeting with all relevant subject matter experts and stakeholders in early 2020 clarify concerns and identify a suitable approach to address concerns. Meeting scheduled for 22/01/20.
13/12/19	North Notch 3 pre-submission stakeholder meeting	NLC, SSB, DPIR	Discussion of environmental risks surrounding further reduction in clay core crest height of TSF	Non-minuted	ERA continued drafting application, taking into account comments provided by stakeholders during the meeting
13/12/19	GW model meeting – Uncertainty Analysis Meeting #1	ERA (DS, CN), INTERA, SSB (AL), IGS (GH, TL)	Initiative meeting for post closure solute transport modelling with uncertainty analysis. Follow up discussion relating to head recovery modelling and closure monitoring bore design.	IGS raised sought clarity around bore calibration weighting, specifics on handling of climate change, and reporting of model uncertainty. IGS provided comments via email which INTERA and ERA will seek to address during modelling works. Follow up questions relating to head recovery modelling regarding recharge through waste rock. Follow up questions to closure monitoring bore design at Pit 1 and Pit 3. SSB/IGS support Pit 1 closure bore design, request that P3_CL_04 relocated closer to Pit 3.	ERA has received comments via email from IGS for consideration during post closure solute transport modelling. Next meeting 07/02/20 ERA/INTERA to update head recovery modelling with additional detail on recharge through waste rock ERA to relocate closure monitoring bore P3_CL_04 closer to pit, NW of P3-4B.
11/12/19	Collaborative field work	ERA (DS, SV), SSB (AL, JFS field team)	Collaborative field work to install 2 shallow monitoring bores. One located in a potential GW seep to the SW of the CCLAA (GCTS-7), the other halfway between CCLAA and seep (GCTS-11). SSB provided auger and obtained all permits/approvals for installation, ERA provided consumables and resourcing to install.	None-required.	None-required.
09/12/19	TSF Sub-floor stakeholder engagement	SSB, NLC (DPIR not available)	Introduce application for TSF Subfloor material management.	Interested in levels of contamination (drilling results).	Plan an update meeting after BPT UTE's finalised and risk assessment completed.
06/12/19	MERRG	ERA (CN, SR, DS), SSB (AL)	Discussed: <ul style="list-style-type: none"> Pit 1 Construction monitoring plan – Amie has issued to her team for feedback Contaminated sites drilling progress – Dave talked through Pit 1 monitoring Status of monitoring frameworks following Ingrid's workshops – agree to focus on Stage 13 monitoring CCLAA monitoring bore installs planned	Amie and team were happy with the contaminated sites SAQP.	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
11-13/11/19	ARRTC 43	ARRTC members & observers	<p>Item discussed:</p> <ul style="list-style-type: none"> ERA provided operation, rehabilitation updates, groundwater modelling and relevant studies to approvals. KKN discussion Joint project list (SSB/ERA) and report on schedule Progressing SSB's Ecosystem Restoration Standard, metrics and application Stage 13 revegetation trial State-Transition modelling update Water and sediment working group and program update Other uranium site Stakeholder updates 	<p>SSB note work ahead for ARRTC and the need to be focussed and systematic given the time between now and final rehabilitation is short.</p> <p>The pre-distributed KKN amendments were endorsed by the Committee subject to some minor clarifications and word alterations.</p> <p>The majority of projects were endorsed by the Committee, subject to addressing comments as actions.</p> <p>The Committee recognise that the current SSB and ERA research programs could raise additional questions and there could be a requirement for research from unforeseen eventualities.</p> <p>SSB will look for guidance from ARRTC to finalise SSB Ecosystem Restoration Standard metrics and application.</p>	<p>ERA to provide a summary of research related to the Pit 3 application including learnings from Pit 1 to ARRTC</p> <p>ERA/SSB project description to include intended outcomes and implications, and an indication of resources required.</p> <p>ERA/SSB to improve cross referencing in projects that address multiple KKNs.</p> <p>ERA/SSB to provide summaries of closed projects to ARRTC to detail outcomes and how information will be used.</p> <p>ERA and SSB to consider two additional projects identified by the committee that are required to address KKNs:</p> <ul style="list-style-type: none"> (WS2) Identify far field groundwater discharge points (ESR8) Identify an appropriate fire regime to facilitate the development of a sustainable ecosystem on the rehabilitated landform <p>Paul Brown (ERA) to review Barry Noller's report and provide to ARRTC.</p> <p>A session on monitoring to facilitate adaptive management to be included as an agenda item for the next meeting.</p>
06/11/19	Site visit by DPIR	DPIR	<p>Informal site visit by new DPIR representative, Max Smith, Manager Ranger Closure.</p> <p>Meeting with GM for site introduction.</p> <ul style="list-style-type: none"> Visited Processing area, Pit 1, Pit 3, and TSF. 	<p>Follow up emails raised concern regarding: TSF leakage detailed in video produced by GAC in 2013.</p> <p>Safe and secure deconstruction and deposition of industrial infrastructure in Pit 3.</p> <p>Requested to spend time with ERA SME's ahead of approvals and authorisations.</p> <p>Request to further understand groundwater and surface water interactions</p>	<p>ERA to co-ordinate sessions for transfer of important information to DPIR representative.</p>
24/10/19	Groundwater meeting	ERA (DS, CN, AN), SSB (AL)	<ul style="list-style-type: none"> CCLA EC anomaly in creek to the south. Glenn Harrington's feedback forwarded to INTERA Updated conceptual model report send through – SSB to undertake a 'validation' review to check Glenn's comments addressed by INTERA Glenn to review Brian Barnett's assessment against GW modelling guidelines Uncertainty analysis has been received by ERA from INTERA. Will be reviewed prior to issue to SSB General discussion around level of interest in GW – SW interactions and model outcomes. For discussion once SW model report issued <p>TSF solute transport model results in review by ERA, requested further feedback from INTERA. Results will be shared with SSB as updated</p>	Ongoing consultation	<p>ERA and SSB working on plan to auguring in a few shallow monitoring bores south of CCLA (with Andrew Nelson) – target 20/11. Subject to T/O approval (Amie to manage this)</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
21/10/19	MERRG	ERA (CN, IM), SSB (AL)	<ul style="list-style-type: none"> Worked through Amie's comments on the Pit 1 Construction monitoring plan Discussed thoughts on a MERRG metric Discussed structure of Pit 1 Closure (rehab) phase / TLF monitoring plan Ingrid discussed expectations for monitoring workshops next week 	Ongoing consultation	Chris to finalise construction monitoring plan Chris and Ingrid to finalise structure of Closure phase monitoring plans for Pit 1 and TLF, to issue to stakeholders ahead of workshops
18/10/19	MTC	SSB, LC, GAC, DPIR, DIIS	ERA provided: <ul style="list-style-type: none"> General update on general/water/resourcing activities in Ranger Updates on closure activities including Rehabilitation progress report, tailings dam, Pit 1 and Pit 3 activities, onsite monitoring and rehabilitation, Pit 3 injection/dewatering bore Provided TLF controlled burn report Current approval schedule report on S29 Environmental incident – Exotic species (West Indian Pinkroot) SSB provided updated for ARRTC and Ranger audit. DPIR is conducting a review of Ranger Authorisation. ERA requested to change Annual Groundwater Report and Water Management Plan submission date. <ul style="list-style-type: none"> DPIR will review S29 reporting threshold. 	Stakeholder agreed to change of submission date for Annual Groundwater Report and Water Management Plan. Stakeholder agreed to establish approval schedule and intermittent submission of completed studies prior to submission.	SSB to discuss modelling turbidity in surface water with ERA. ERA to provide MTC with a compilation of reports summarising the progress of tailings consolidation in Pit 1 and Pit 3. DPIR to complete a review of the approvals process and engage with stakeholders. ERA to send a letter formally requesting this change. ERA to update the schedule of applications and consult with stakeholder regarding assessment timeframes. DPIR to clarify S29 reporting requirements by end of November. ERA to provide the Incident Action Plan and Weed Spread Prevention Plan for the Indian Pinkroot to MTC stakeholders.
17/10/19	Casual catch-up	DPIR (MS)	Non-minuted	Non-minuted	Non-minuted
08/10/19	MERRG	SSB	Discussed draft Pit 1 research and monitoring plan document structure.	Decided to create 2x research and monitoring plans for Pit 1: Construction Phase (using existing draft) and Ecosystem Rehabilitation.	None minuted
01/10/19	WASWG	NLC, SSB, DPIR	Timeline for agreement on closure criteria still needs to be refined based on Application and rehabilitation schedules. ERA provided updates on projects (Mg effects, Acid Sulfate Soils, sediment monitoring and the SW model). Andrew Harford gave an update of SSB projects	General agreement from the group that using the Water Quality Management Framework (WQMF) is a good approach, incorporating the requirements of BPT and ALARA as required.	ERA to forward invite to the October 24 BMT meeting to WASWoG members ERA and SSB to check for historical vanadium data ERA to follow up on suspended sediments in SW modelling Paul Brown to review Melanie Trenfields's (SSB) speciation modelling work ERA to review papers where ALARA has been used outside of radiation field and present at later meeting ERA to forward her Mine Closure Conference paper and presentation to WASWoG members ERA to follow up about arrangements for Mark Taylor's involvement

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
18/09/19	ERA Closure update	Red Lily Health Board	Non-minuted	Continued engagement	Non-minuted
13/09/19	SSB meeting	SSB	<ul style="list-style-type: none"> Landform modelling approach by SSB Particle size distribution (PSD) scope (ERA) MERRG (monitoring evaluation and research review group)	<ul style="list-style-type: none"> ERA advised final landform v6.2 is done and won't change unless major issues identified SSB will issue tech memo on initial Pit 3 catchment modelling and provide feedback to ERA SSB approved the proposed PSD methodology MERRG: ERA to translate Pit 1 rehab monitoring framework into monitoring plans for Pit 1 and TLF, plus develop a metric to track progress	None minuted
22/08/19	ERA Information Day and mine bus tour	General public	<ul style="list-style-type: none"> Free public mine tours to learn about ERA's operations and closure projects. 	<ul style="list-style-type: none"> Non-minuted 	Non-minuted
09/08/19	RCCF	SSB, DPIR, GAC, DIIS, NLC	<ul style="list-style-type: none"> ERA provided closure updates for Stockpile Particle Sampling Program and Rehabilitation Studies and Land Trials (cool-burn, root excavation, species establishment program and trials). SSB reported study result for aquatic organism community in surrounding groundwater environment. KKN amendments ERA provided information regarding groundwater modelling configuration, calibration and results. ERA provided closure site operation updates.	SSB recommended the following: <ul style="list-style-type: none"> Large landform not to be disturbed by the plant establishment trials The final concentration in billabong during dry season is contributed by not only evaporation but groundwater contamination input which is not considered in the model. Closer internal communications with all parties to ensure most efficient outcomes. DPIR require updates regarding Pit 3 drilling progresses.	ERA provide report on Stockpile Particle Sampling Program and cool-burn weed control. Investigate any similarities between the aquatic organism community in groundwater and surface water environment. Further discussion for KKN development. Improve groundwater model to incorporate water quality parameters. Agreement on closer internal communications.
30/07/19	ERWG	NLC, SSB, DPIR, ARRTC	Reiteration of ERWG function and outcomes of meeting to date Update from SSB-ERA meetings regarding reference sites Outcomes from state and transition workshop ERA species establishment program. <ul style="list-style-type: none"> 2019/20 planned pant establishment trials 	Agreement with pit 1 working as a trial for rehabilitation. SSB acknowledge the need to clarify using full distribution data, Stakeholder agree the applicability of the state and transition model. SSB made suggestions on planned establishment trials and would like to see a manual outlining the purpose and methodology.	In next meeting provide: <ul style="list-style-type: none"> Update of selection of reference sites Update on species list for rehabilitation program Update on Pit 1 trials

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
25/07/19	ERA Information Day and mine bus tour	General public	Free public mine tours to learn about ERA's operations and closure projects.	Non-minuted	<ul style="list-style-type: none"> Non-minuted
20/06/19	ERA Information Day and mine bus tour	General public	Free public mine tours to learn about ERA's operations and closure projects.	Non-minuted	Non-minuted
03/06/19	Stakeholder business update	Parks Australia	Present an update on key events relating to ERA's operations.	Non-minuted	Non-minuted
24/05/19	MERRG	SSB	Monitoring	Ongoing consultation	None minuted
23/05/19	ERA Information Day and mine bus tour	General public	Free public mine tours to learn about ERA's operations and closure projects.	Non-minuted	Non-minuted
14-15/05/19	ARRTC 42	ARRTC members & observers	<ul style="list-style-type: none"> ERA and SSB reported updates on operations and progressive rehabilitation at Ranger. SSB provided update on SSB's research program and wet season monitoring. KKN consolidation and amendments (removal). Updates regarding surface and groundwater COPC guidelines/Standards revisions and mixtures work and CERA2, water quality frameworks, site-wide conceptual model update and calibrated/post-closure groundwater flow models for Ranger Mine, and solute transport model for Pit 3. Ecosystem restoration updates including ERWG progresses and outcomes, Dixon's summary of rehabilitated/legacy mine-site tour, rehabilitation trajectories workshop and status of revised Ranger Revegetation Strategy. Activities on other uranium site CDU's progress report on NESP projects. Stakeholder updates	<p>The Committee noted that the matrix of KKNs and projects is a long list and it is not clear that each KKN has an associated project.</p> <p>The committee has no objections to proceeding with the close-out/removal of few radiation KKNs (RAD3B, RAD3C, RAD4A, RAD4B, RAD4C and RAD6A).</p> <p>The committee queries about the water models' confidence for mixtures prediction.</p> <p>The committee it would be useful to consider likelihood in the context of Ranger revegetation management plan.</p> <p>The committee highlighted key outcomes that the revised strategy would need to achieve that certain assumptions relating to revegetation of the Ranger final landform still need to be substantiated.</p> <p>The committee commented on the role of billabongs as critical habitats for fish or their importance to the TOs and the broader landscape were not mentioned in fish migration studies.</p> <p>The committee mentioned monitoring data interpretation against criteria is worth consideration, and sampling efforts to collect such data would be resource intensive.</p> <p>The committee also noted terrestrial habitat and fauna in the context of the Ranger final landform is not considered.</p>	<p>SSB to work with ARRTC to distil outstanding questions/comments on the RMCP and reconcile with ERA's response previously provided. ERA to respond to outstanding ARRTC questions/comments.</p> <p>SSB to provide a list of all publications (including abstracts) to ARRTC in SSB's report for each meeting.</p> <p>SSB-ERA to provide an update on projects against the KKN project list.</p> <p>ARRTC to review: (i) Secretariat support for future meetings; and (ii) meeting structure to ensure there is sufficient time for consideration of technical and strategic matters in order for the Committee to provide considered advice.</p> <p>ERWG to discuss outcomes of the Review of the Ranger Revegetation Strategy and Supporting Information and provide a summary of the discussion to ARRTC.</p>
09/05/19	Stakeholder business update	Jabiru Health Center	<ul style="list-style-type: none"> Present an update on key events relating to ERA's operations. 	Non-minuted	Non-minuted
09/05/19	MERRG	SSB	Monitoring	Ongoing consultation	None minuted
08/05/19	Stakeholder business update	SSB	Present an update on key events relating to ERA's operations.	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
02/05/20	ARRAC 51	ARRAC members & observers	<p>ERA provided an update on its operations, including health and safety, environmental performance, water management, closure planning and rehabilitation.</p> <p>SSB provided a strategic overview of SSB's work in stakeholder engagement and the progress of KKNs, mine rehabilitation activities and assessments, monitoring program, supervision activities and external engagement activities undertaken by the SSB.</p> <p>The NT DPIR provided an overview of mining activity in the Alligator Rivers Region.</p> <p>Parks Australia provided update including some background on his role as Assistant Security Kakadu and Strategic Priorities, and an update on the \$216 million funding package for Kakadu National Park and the future of Jabiru.</p>	<p>ECNT noted that there is a need to focus on progress on milestones of assessment timelines and provide details.</p> <p>DPIR noted the importance of having confidence in the scaling of rehabilitation efforts, and the need for early understanding of, and resolution of, critical issues.</p> <p>ECNT and DPIR commented on the incident related to radiation clearance of a crane at Ranger Mine.</p> <p>NTEPA expressed an interest in the RMCP and how rehabilitation works progress through to completion.</p>	ERA committed to providing more details outlining the sufficient assurance for rehabilitation milestones.
30/04/19	Stakeholder business update	Jabiru Area School teaching staff	Present an update on key events relating to ERA's operations.	Non-minuted	Non-minuted
29/04/19	MERRG	SSB	Monitoring	Ongoing consultation	None minuted
29/04/19	Stakeholder business update	West Arnhem Regional Council, local businesses/organisations	Present an update on key events relating to ERA's operations.	Non-minuted	Non-minuted
26/03/19	ERWG	ERWG members	Ecosystem similarity	Species composition discussed.	General agreement that more detailed and clearer information from all parties is required.
15/03/19	RCCF	ERM, DPIR, DIIS, GAC NLC, SSB	<ul style="list-style-type: none"> Findings and proposed method for updating background COPC in groundwater General Ranger update and metrics Pit 3 Subaqueous deposition trial update HDS update <p>Developing a restoration trajectory for Ranger mine</p>	None minuted	<p>Track seed gathering progress against target with information provided in ERA Revegetation Seed Stock documents presented by P Lu.</p> <p>ERA to present closure schedule sections relating to studies and KKNs.</p>
06/03/19	Presentation to the Darwin Mining Club	Darwin Mining Club	<ul style="list-style-type: none"> Presentation about ERA's achievements over 40 years and the importance of Ranger rehabilitation as a significant project 	None minuted	None minuted
March 19	Visit by Mirarr Traditional Owners and rangers to the Trial Landform	Traditional Owners and rangers	Non-minuted	Non-minuted	Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
11/02/19	ERWG	ERWG members	<ul style="list-style-type: none"> Plant available water (PAW) and Pit 1 water balance; Soils and Fauna Revegetation strategy- e.g. single pass establishment or staged. 	<p>General consensus around the modelling presented by ERA. The modelling shows that there would be sufficient PAW to support a community similar to the reference with 67% (or less) rock and 4+ m of substrate. However PAW water is likely to be deficient if the substrate is above 72.5% rock.</p> <p>Potential/Planned Future Studies:</p> <ul style="list-style-type: none"> Additional WAVES modelling. Spatial variability of the fine earth fraction. Sensitivity analysis regarding the rate of weathering. Potential effects of climate change. <p>General consensus that an “incidentally consolidated horizon” is not a barrier to plant roots and may assist in preventing macro- pores and hence is not considered a concern.</p> <p>Pit 1 monitoring details: General consensus around the broad strategy. Agreement from ERA that they are open to input from group members on the detail of monitoring and research methods.</p> <p>Ranger Ecosystem Restoration Trajectory Project: Ecosystem similarity and novel substrate issue can be discussed by this group in a meeting prior to the project workshop 29-30 April. Discussion was held around novel substrate and that there is as yet no evidence it cannot support a community similar to the reference site.</p>	<p>ERA to provide further information– including longer data set and modelling a dry climate scenario.</p> <p>Form a sub-group to discuss what monitoring should be undertaken for Pit1-</p> <p>Committed to undertaking additional work on particle size distribution on the trial landform.</p>
07/02/19	MTC	MTC members	<p>ERA provided an update on closure activities including:</p> <ul style="list-style-type: none"> Ranger closure schedule Minor project statues Water inventories Site water balance – assumption tracking Activities updates Brine squeezer for process water Pit 1 backfill and tailings consolidation Tailings management Pit 3. 	None minuted	None minuted
18/01/19	RCCF	ERM, DPIR, DIIS, GAC NLC, SSB	<ul style="list-style-type: none"> Findings and proposed method for updating background COPC in groundwater General Ranger update and metrics Pit 3 Subaqueous deposition trial update HDS update Developing a restoration trajectory for Ranger mine The nursey and closure schedule were discussed 	None minuted	<p>Track seed gathering progress against target with information pr</p> <p>vided in ERA Revegetation Seed Stock documents presented by P Lu.</p> <p>ERA to present closure schedule sections relating to studies and KKNs.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
14/12/18	MTC	MTC members	<p>ERA provided an update on Current closure activities including:</p> <ul style="list-style-type: none"> Closure schedule Minor project status Pond and process water management Pit 1 backfill Tailings management Mine Closure Plan Pit 1 final landform application Pit 1 update Pit 3 backfill and tailings deposition ERA provided an update on the subaqueous deposition trail 	None minuted	None minuted
13–14/11/18	ARRTC 41	ARRTC members & observers	ERA provided an update on the Mine Closure Plan and the Restoration Operational Plan. The Supervising Scientist provided an overview of SSB's mine closure plan assessment report.	<p>The ARRTC noted/queried:</p> <ul style="list-style-type: none"> The timeline regarding assessment of the 2018 MCP. Whether ERA has considered climate change risk. 	A standing agenda item be added to review the status of research, supervision and/or monitoring activities being conducted for other uranium sites in the broader Alligator Rivers Region.
11/10/18	RCCF	Rio Tinto, DPIR, DIIS, GAC, NLC, SSB	<ul style="list-style-type: none"> General update and metrics Feasibility study update FS Demolition and Disposal Seed harvest, Storage and Nursery update Water Flowchart Pit 3 CPT testing update <p>SSB update on current revegetation studies</p>	<ul style="list-style-type: none"> None minuted 	<p>Track seed gathering progress against target with information provided in ERA Revegetation Seed Stock documents presented by P Lu</p> <p>Pit 1 decant geochemistry report (P Brown) to be uploaded to the Ongoing Ranger Closure Workspace when available</p> <p>Contaminated sites and Pit 3 Tailings deposition plan to be discussed in the feasibility update at next forum</p> <p>Water treatment model to be run for a current water treatment scenario (no additional water treatment) vs a planned water treatment scenario</p> <p>Information to be provided on floating pipeline behaviour and design</p> <p>Floating pipeline diameter to be confirmed and sent to DPIR</p> <p>ERA to use CSIRO CFD modelling, CPT test results and bathymetry to assess and validate trial modelling</p> <p>Revegetation to be the theme for the next forum</p>
13/09/18	AARAC 50	AARAC members	<ul style="list-style-type: none"> ERA presented a presentation outlining the contents of the MCP and a closure update SSB assessment report on the MCP 	None minuted	ARRAC to request AARTC for its consideration of the Ranger Mine Closure Plan.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
12/09/18	MTC	MTC members	<p>ERA provided an update on current closure activities including:</p> <ul style="list-style-type: none"> • Closure critical path • Minor project status • Pond and process water management • Site water balance • HDS plant • OPSIM assumption tracking • Brine management • Pit 1 backfill • Tailings management • Pit 3 bathymetric survey • Pit 3 Backfill and Tailings Deposition Update. 	<p>The Mine Closure Plan has been reviewed. SSB have made their Assessment Report publicly available on 11 September 2018. SSB explained the rationale for several of their recently distributed Rehabilitation Standards. DIIS stated that they will follow the process outlined in Annex B of the Authorisation to request comment from NLC/GAC.</p> <p>Version 5 Final landform digital elevation model will be provided to SSB on 21 September 2018. SSB expect long term landform modelling to take a few months. SSB will provide further comment to ERA on the Pit 1 application next week.</p>	None minuted
04/09/18	Ranger Progressive Rehabilitation Monitoring Workshop Meeting	SSB, DPIR, IGS, UQCLMR, NLC, DIIS	<ul style="list-style-type: none"> • Overview of the Progressive Rehabilitation Schedule. A copy of the rehabilitation schedule and draft execution schedule was provided. • Closure criteria themes and associated monitoring commitments. Current operational monitoring includes water (Pit 1, Pit 3, TSF) and sediment, radiation, flora and fauna, soils and cultural heritage. 	Monitoring requirements per theme including groundwater, ecosystem restoration, radiation and landform.	<ul style="list-style-type: none"> • Run-off monitoring requirements and methods for Pit 1 should be determined ASAP collaboratively by SSB and ERA to fit into the design. • For radiation dose assessment, opportunistic collection and analysis of fruits would be very useful from a stakeholder-assurance perspective. • SSB to distribute notes from meeting – both overall and group findings. <p>ERA to use notes as a basis for developing monitoring programs and is encouraged to work collaboratively with SSB as required.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
24/08/18	RCCF	CSIRO, Rio Tinto, DPIR, DIIS, GAC, NLC, SSB	Topics discussed included: <ul style="list-style-type: none"> Nursery Pit 1 decant geochemistry report Feasibility Water treatment model Sub aqueous discharge trial Revegetation 	None minuted	<ul style="list-style-type: none"> Track seed gathering progress against target with information provided in ERA Revegetation Seed Stock documents presented by P Lu Pit 1 decant geochemistry report (P Brown) to be uploaded to the Ongoing Ranger Closure Workspace when available Contaminated sites and Pit 3 Tailings deposition plan to be discussed in the feasibility update at next forum Water treatment model to be run for a current water treatment scenario (no additional water treatment) vs a planned water treatment scenario Information to be provided on floating pipeline behaviour and design Floating pipeline diameter to be confirmed and sent to DPIR ERA to use CSIRO CFD modelling, CPT test results and bathymetry to assess and validate trial modelling Revegetation to be the theme for the next forum
25/07/18	MTC	MTC members	ERA provided an update on current closure activities including: <ul style="list-style-type: none"> Tailings dam activity Pit 3 backfill and tailings deposition Closure critical path Minor projects status Pond and process water management Site water volume OPSIM assumptions tracking OPSIM do nothing scenario Volume of brines injected Pit 1 backfill material placement Pit 1 settlement monitoring Pit 1 decant Tailings transfer 	None minuted	<ul style="list-style-type: none"> ERA to include future contingencies and mitigations for identified impact resulting from tailings disposal in the Mine Closure Plan and the tailings deposition application. ERA to provide a schedule of all activities related to Pit 3. ERA to provide a presentation of the outcomes of the finalised Feasibility Study. ERA to provide clarification on the calculations for brines volumes. ERA to provide MTC with a compilation of reports summarising the progress of tailings consolidation in Pit 1 and Pit 3. ERA to provide MTC with an application for subaqueous tailings deposition in Pit 3, providing the supporting relevant information progressively prior to the finalised application.
13/06/18	MTC	MTC members	<ul style="list-style-type: none"> ERA provided an update on current closure activities. 	SSB raised their previous concerns from November 2017 and the January Pit 3 Workshop about the need to update tailings properties in the consolidation modelling to reflect segregated tailings. There was discussion between SSB and ERA about SSB's concerns for resourcing, personnel, and timeframes on this issue (and other environmental management areas like revegetation). NLC and GAC also raised these concerns.	<ul style="list-style-type: none"> ERA to provide the upper limit of the proposed HDS plants treatment capacity, the capacity of the plant, and the ability to subsequently dispose of the treated water.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
25/05/18	RCCF	Rio Tinto, DIIS, DPIR, SSB	<p>Topics discussed included:</p> <ul style="list-style-type: none"> HDS Magnesium Closure Criteria Nursery TSF Eastern Wall Notch Pit 1 decant geochemistry progress Surface water model <p>Radiation</p>	None minuted	<ul style="list-style-type: none"> HDS plant restart update to be provided at next forum MI to meet with SSB to discuss HDS approval status, testing and monitoring needs to support notification/proposal prior to restart Knowledge Management Committee being formed as part of Phase 3 of the water quality framework project should be treated as a MTC Technical Working Group. MI to send Phase 3 project proposal to MTC members. MTC to discuss at next meeting. Align framework of Magnesium Closure Criteria project to cumulative surface water risk assessment. Create a metric to track seed gathering and storage MI to load full Paul Brown presentation and relevant references to Ranger Closure SharePoint as way of sharing information on the process water characterisation. Surface water model technical memo to be sent to stakeholders before 23 March 2018. Model runs pending stakeholder response to memo. <p>K Tayler to send ERA an internal SSB internal report on radiation doses to Aboriginal people from the operation of the Ranger uranium mine. Not for distribution outside of ERA.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
16-17/05/18	ARRTC 40	ARRTC members & observers	<ul style="list-style-type: none"> ERA provided an update on its Pit 3 tailings deposition strategy and rehabilitation commitments and schedule. ERA provided a review of its draft closure criteria for flora and fauna, including its justification and rationale for each's outcome and parameter. ERA presented an overview of the key historical work conducted to date on revegetation trials and other related activities informing the key elements of its revegetation strategy. ERA provided an update on, and results of, its research project to investigate plant water use at analogue and waste rock sites and whether the waste rock substrate of the Ranger final landform can supply sufficient plant available water to sustain a local native woodland. ERA updated the ARRTC on: its knowledge related to locations and concentrations of contamination from the decommissioned site; further modelling to improve these predictions; and how the predicted concentrations compare to water quality that has (i) been irrigated on woodland species in the land application areas, and (ii) to which plants at the edge/on bunds of wetland filters, ponds and sumps have been exposed for several decades SSB provided an update on its key tasks and key assessments for 2018, a summary of its 2017-18 wet season water quality and biological monitoring results, a progress report on its 2017-18 research projects, an update on the status of the Supervising Scientist's Rehabilitation Standards, and an outline of its proposed 2018-19 work program. SSB provided an update on the KKNs for groundwater, a comparison of current projects against the related KKNs, and research gaps. SSB provided a briefing on the development of the Supervising Scientist's draft flora Rehabilitation Standard. SSB provided the results of a historical study on the effect of magnesium sulfate on the germination of 20 plant species native to KNP (Malden, J.S. 1995). SSB provided a briefing on SSB's Remote Piloted Aircraft System platforms, and short videos 	<p>It was noted by DPIR and ARRTC that the proposed substrate for the final landform is of concern when considering achieving 'an environment similar to the adjacent areas' (ER 2.1), though demonstrated growth of trees on the TLF is encouraging.</p> <p>The ARRTC made the following specific comments on the draft closure criteria:</p> <ol style="list-style-type: none"> For fauna, that these appear to have been considered belatedly, and are inadequate in their current form. For example, the criteria need more information on specific population demography, density and so on For flora, that these are insufficient and need more information on demonstrating sustainability, e.g. reproduction, prescriptive demographic profiles (including age structure of trees for example). There is a lack of consideration to soil microbiology. ERA pointed out there are nutrient cycling criteria and microbiology is implicit in this. <p>ARRTC requested ERA adopt more explicit (clear) language in its strategy report, and better reference and cite throughout the empirical evidence upon which it is based. ERA stated this information would be provided in the RMCP.</p>	<p>ARRTC to consider the consolidated KKNs and provide any comments or advice on same to the Supervising Scientist by end July 2018.</p> <p>ARRTC to provide ERA with a list of reports it wishes to obtain from ERA on past revegetation trials, for the ARRTC restoration sub-group's consideration, in particular of the scientific evidence underlying ERA's revegetation strategy.</p> <p>ARRTC restoration sub-group to work out what additional information and evidence the ARRTC needs and report back to ARRTC. To do this, the sub-group will:</p> <ul style="list-style-type: none"> Gather the information it can, and cross-check this with the KKNs, and consider whether any more KKNs (knowledge gaps that must be addressed) should be proposed; Look at the current project list and cross-check this with the KKNs, and proposed any amendments as necessary; and Advise on exactly what specific projects ARRTC thinks are required to address key questions and knowledge gaps <p>ARRTC to provide ERA with a list of its concerns with the PAW project.</p> <ul style="list-style-type: none"> ERA to provide ARRTC with requested reports related to the project, and ARRTC to provide SSB with its advice on the matter.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
06/04/18	MTC	MTC members	<p>ERA provided an update on the draft mine closure plan and the Pit 3 Tailings Deposition Schedule</p> <p>ERA provided an update on closure activities including:</p> <ul style="list-style-type: none"> BC distillate production; Process water volume balance Dredged tailings movement Pit 1 backfill material placement Pit 1 settlement monitoring Pit 3 MOL OPSIM central estimates Free process water versus total treated water Closure critical path Closure schedule with approvals 	<p>DIIS discussed key closure document (MCP and Annual Plan of Rehabilitation) status / relationship.</p> <p>4. The MTC agreed that ERA could continue backfill placement using Grade 1s waste rock material until 6Mt remains to be placed for the final landforms per previous conditions. The placement of the final 6Mt is contingent upon resolution of a number of issues including traditional owner aspirations and the ability to support vegetation.</p>	<ul style="list-style-type: none"> ERA to provide as much detail as possible on OPSIM assumptions. SSB and ERA to organize a workshop to discuss a long-term monitoring plan for revegetation and pit 1. MTC is to review process water levels in Pit 3 at the end of the 2017/18 wet season. ERA to present the value ranges associated with inputs and outputs for OPSIM. ERA to provide definition of post closure monitoring terminology. <p>ERA to provide the new date for the Pit 1 Final Landform application.</p>
16/03/18	RCCF	DIIS, DPIR, SSB, GAC, NLC, JRHC	<p>General update and metrics</p> <p>Feasibility study update</p> <p>Air quality and radiation dose assessment</p> <p>Closure plan update</p> <p>Approvals (status):</p> <ul style="list-style-type: none"> Pit 1 Final landform and revegetation plan Pit 3 Sub-aqueous discharge TSF Notch east wall TSF Northern ramp High Density Sludge (HDS) plant Brine squeezer <p>Ranger mine Magnesium closure criteria project phase 3</p> <p>Rehabilitation - Nursery update</p> <p>Status of KKN's</p> <ul style="list-style-type: none"> Pit 1 decant geochemistry progress 	None Minuted	<ul style="list-style-type: none"> HDS plant restart update to be provided at next forum MI to meet with SSB to discuss HDS approval status, testing and monitoring needs to support notification/proposal prior to restart Knowledge Management Committee being formed as part of Phase 3 of the water quality framework project should be treated as a MTC Technical Working Group. MI to send Phase 3 project proposal to MTC members. Align framework of Magnesium Closure Criteria project to cumulative surface water risk assessment. Create a metric to track seed gathering and storage Surface water model technical memo to be sent to stakeholders before 23 March 2018. Model runs pending stakeholder response to memo. K Tayler to send ERA an internal SSB report on Radiation doses to public completed by ERISS as part of a Cancer study. Not for distribution.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
09/02/18	MTC	MTC members	The closure schedule was presented.	<ul style="list-style-type: none"> SSB queried if the Closure Schedule for revegetation would be completed by 2026, referring to presentation at ARRTC showing understorey planting will occur after 2026. ERA responded that revegetation activities will be occurring post 2026 and terminology used by ERA refers to as "post closure monitoring" includes monitoring, maintenance and revegetation activities. Currently the FS plans for 25 years. ERA will provide the Post Closure Monitoring activities and schedule in The Feasibility Study, due July 2018. Integrated water and tailings study commenced Dec 2018, expected to be a 12-month study. With an aim to increase dredge capacity and productivity. <p>SSB requested ERA highlight changes to the closure schedule in future presentations.</p>	<ul style="list-style-type: none"> ERA to provide the new date for the Pit 1 Final Landform application. ERA to update graphs for rehabilitation metrics to show a rolling 12 months. ERA to present probability curves for OPSIM. ERA to present the values associated with input and outputs for OPSIM. ERA to provide definitions of Post Closure Monitoring terminology. ERA to highlight changes to the Closure Schedule with Approvals.
5-6/12/17	ARRTC 39	ARRTC members & observers	<ul style="list-style-type: none"> ERA report and closure update Landform design Environmental outcomes KKNs Tailings deposition <p>Revegetation</p>	<ul style="list-style-type: none"> Importance of information for reducing uncertainty in relation to KKNs Mechanisms for sharing information with indigenous communities Potential for pit subsidence post-closure- ERA noted consolidation being monitored in pit 1 and shows conformance with the modelling Revegetation, including understory – ERA noted learnings from trial landform revegetation and Jabiluka will be applied to Pit 1 and the monitored and adapted as necessary across site. Deposition method and potential related impacts Consolidation modelling sensitivities Magnesium plume and Magela Creek Groundwater and surface water interactions Landform impacts Runoff and erosion from proposed access tracks Correlation between various closure criteria 	<ul style="list-style-type: none"> ERA to provide ARRTC with its updated hydrogeological report for Pit 3 for comment ERA to provide an update on the Pit 3 tailings deposition strategy and relevant reports ERA to provide backfill cross sections for Pit 1 and Pit 3, which include the nature of layers (rock types) and location of sulphide risks Regarding water balance, ERA to provide advice on root depths of vegetation from the water extraction profile ERA to present to ARRTC its state of knowledge in relation to vegetation recruitment ERA to provide ARRTC with its weed strategy
28/11/17	MTC	MTC members	<ul style="list-style-type: none"> ERA presented an update on the status of Ranger rehabilitation and closure activities, including the current closure schedule for major rehabilitation activities. 	<ul style="list-style-type: none"> SSB reiterated previous advice that closure criteria should be numeric, not a process. SSB would support the use of the process that has been proposed by ERA if it was used to develop specific, numeric closure criteria. 	<ul style="list-style-type: none"> ERA to include tailings pore water volumes in the process water inventory for future presentations
15/09/17	MTC	MTC members	ERA provided the draft plan on 21/12/2016. SSB provided their initial adequacy review on 7/4/17. DPIR provided a response letter on initial review and NLC and GAC have provided ERA their initial adequacy response on 26/4/17. DPIR provided comments on 31/7/17 and SSB provided their assessment report on this date. NLC/GAC provided further comment on 21/8/17. The next version of the Plan is hoped to be submitted prior to the end of 17.	ERA provided the MMP on 16/3/17. Comments for this plan are due by the extended date of 5/5/17. Additional information was requested 23/5/17 and provided on 23/6/17. This MMP was approved on 23/8/17.	SSB will circulate a draft attachment to the Authorisation for ERA to periodically report on closure metrics.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
14/09/17	ARRAC 48	ARRAC members & observers	ERA report and closure update (including tailings deposition methods)	Queries regarding impact of deposition strategy on closure timeline	ERA to provide an update on the underbed drain and dewatering bore in Pit 3.
16-17/05/17	ARRTC 38	ARRTC members & observers	<ul style="list-style-type: none"> ERA report and closure update (including tailings deposition methods) CCLAA to Gulungul Creek Upper Tributary groundwater plume delineation GCT2 interception system update Landform flood modelling to inform sediment/erosion management Revegetation research update and Vegetation understorey trial.	<ul style="list-style-type: none"> Concerns presented by GAC about lack of (i) specific KKNs for cover design parameters to ensure successful revegetation, (ii) detail on same in Ranger Closure Plan, and (iii) recent research and monitoring programs to support design criteria. Support from members and stakeholders for proposed sediment and erosion controls and planned understorey trial.	<ul style="list-style-type: none"> Minutes of meeting publicly available. Next ARRTC meeting is to focus on these issues.
03-05/09/17	(SSB led) groundwater workshop	SSB (and various consultants to SSB: SA Department of Environment, Water and Natural Resources, Office of Water Science, Geoscience Australia; DJ), GAC, NLC, DPIR, DIIS, INTERA	<ul style="list-style-type: none"> Response to stakeholder questions and discussion on the Ranger conceptual model and solute transport (from Pits 1 and 3) models. 	<ul style="list-style-type: none"> Fractures, faults and subsurface pathways, sensitivity of model; geochemical source term, temporal resolution. A summary of the workshop was provided to ARRTC 37 	<ul style="list-style-type: none"> INTERA provided 2.5 days of presentations addressing questions provided in advance and during the meeting. Conceptual Model report updated with response to major concerns raised. Additional work scoped to update solute egress modelling to address outstanding concerns. Scope of works provided to stakeholders for input.
10-11/08/17	ARRTC 36	ARRTC members & observers	<ul style="list-style-type: none"> ERA report and closure update (including tailings transfer from TSF, Pit 1 active rehabilitation) Ranger conceptual model	<ul style="list-style-type: none"> Issues discussed with inputs and sensitivities of conceptual model and geochemical source term. 	<ul style="list-style-type: none"> SSB convening a groundwater workshop to review Conceptual Model and models of solute transport from the pits.
25/07/17	ERA consultants (BMT WBM) and Closure criteria water and sediment technical working group (TWG)	CCTWG members	<ul style="list-style-type: none"> Preliminary findings/data of Mg guideline exceedance review and framework for assessing detrimental impact of such exceedances in terms of Environmental Requirements. This work is undertaken by Consultants BMT WBM. 	Discussion centred around: <ul style="list-style-type: none"> The number of water types to be considered the definition of 'different' in the context of biological attributes the use of taxa richness as a measure of environmental impact the definition of detrimental impact level of modelling accuracy	ERA provided a copy of the draft consultant's report to stakeholders for review on 16 August 2017.
16/06/17	MTC	MTC members	<ul style="list-style-type: none"> ERA presented an update on closure activities and a level 1 schedule with a critical path. Progressive rehabilitation metrics were presented. Update was provided on the Osmoflow brine squeezer. 	<ul style="list-style-type: none"> MTC requested ERA provide details of the assumptions of the OPSIM model outputs and include key assumptions as rehabilitation metrics. 	<ul style="list-style-type: none"> SB will circulate a draft attachment to the Authorisation for ERA to periodically report on closure metrics; ERA will provide quarterly updates on OPSIM trace and include actual process water volumes over time and details of key assumptions; and ERA will include details of key OPSIM assumptions in the rehabilitation metrics.
09-10/05/17	ERA consultants (BMT WBM) and Closure criteria water and sediment TWG	SSB, DPIR, GAC	<ul style="list-style-type: none"> Initial consultation on developing a framework for assessing detrimental impact of guideline value exceedances in terms of Environmental Requirements 	Non-minuted	<ul style="list-style-type: none"> Non-minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
03/05/17	Ranger rehabilitation and closure workshop	DIIS, DPIR, NLC, GAC, SSB, Geoscience Australia	<ul style="list-style-type: none"> The DIIS presented a draft preliminary framework for the assessment and approval of rehabilitation implementation at Ranger. GAC raise additional matters including: the time-limited nature of the existing regulatory framework and the issue of survivability; critical pathway analysis to track works and contingency; assessment timeframe(s) and facilitation of stakeholder participation. ERA presented on its needs and schedule for decommissioning and rehabilitation, closure strategy for each domain of the RPA and closure objectives. DPIR presented on the parts of the Mining Management Act relevant to rehabilitation and closure. <p>SSB presented on its role in the rehabilitation and closure process. It is aware of time limitations but must ensure that the ERs are not compromised</p>	<p>Emerging issues were broad ranging, including but not limited to:</p> <ul style="list-style-type: none"> DIIS plans for close-out to be a separate process to rehabilitation approvals. Acknowledgement that the NLC and GAC are consulted throughout the regulatory process via the Minesite Technical Committee. The NLC questioned the robustness of the consultation process if its views could be disregarded under ER 9.4. The resolution of ambiguities in the interpretation and application of ER 9.2 was marked as a critical issue for follow-up. Amendments to the draft rehabilitation applications table to include Ranger 3 Deeps, and approvals timeframes. The level of required technical detail in the separate applications to ensure key elements are adequately addressed. Establishing synergies between the Mining Management Plan and the Mine Closure Plan, as annual updates to both documents is unsustainable. <p>Decision-making process flowchart needs to include a "stop the clock" mechanism. DPIR would be primary approver of any request during assessments. Intergovernmental processes within the framework need to include a set timeframe.</p>	Issues emerging from this workshop particularly relating to the proposed decision-making process, are subject to ongoing stakeholder discussions. The next workshop is scheduled for 13 September 2017.
20/04/17	ARRAC 47	ARRAC, DPIR, SSB	<ul style="list-style-type: none"> Rehabilitation and KKNs 	<ul style="list-style-type: none"> Groundwater quality and seepage matters were raised Concern over the future of Jabiru was raised 	ERA to provide bore monitoring results
19/04/17	MTC	MTC members	ERA provided an update of progressive rehabilitation for Pit 1, Pit 3, dredging and brines injection.	<ul style="list-style-type: none"> SSB requested confirmation that studies for plant available water are being undertaken for assessment for the final land form. SSB suggested that a clause for ERA to periodically report on closure metrics is to be included in the authorisation. 	SSB will circulate a draft attachment to the authorisation for ERA to periodically report on Closure metrics.
10/02/17	MTC	MTC members	The Draft Mine Closure Plan was provided on 21/1/17.	<ul style="list-style-type: none"> There was discussion regarding the future approach and how the Mine Closure Plan is expected to change and be reviewed over time. 	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
29-30/11/16	ARRTC 37	ARRTC members & observers	<ul style="list-style-type: none"> Groundwater drilling program Surface water model Closure milestones Jabiluka revegetation Trial landform vegetation Final landform version 5 <p>Closure criteria as presented in the Closure Plan</p>	<ul style="list-style-type: none"> ARRTC noted a lot of the concerns it has raised over the years around groundwater were being addressed; and noted the release of the Ranger Conceptual Model and Ranger Groundwater Workshop as major advances forward in this regard. ARRTC noted there may still not be 100 per cent agreement around certain groundwater issues, but believed there is now a clear and manageable way forward to resolving these. ARRTC commended the work of INTERA on the Ranger Conceptual Model (groundwater). <p>ARRTC sought clarification on the relationship between the SSB's Rehabilitation Standards and ERA's closure criteria. SSB explained that the Rehabilitation Standards represent the Supervising Scientist's view of what is required to achieve the environmental objectives detailed in the Ranger Environmental Requirements. They represent advice and are not mandatory. In contrast, it is ERA's responsibility to propose closure criteria for the rehabilitation, which, once approved by the relevant Minister, become mandatory. ERA may or may not elect to align its closure criteria with the SSB's Rehabilitation Standards. The relevant Minister will make a decision on whether the closure criteria are approved and, as part of this, will consider the advice of the Supervising Scientist</p>	<p>Minutes of meeting publicly available.</p> <p>ERA committed to provide ARRTC with a copy of the draft Closure Plan, which includes closure criteria (Chapter 6), once all feedback was addressed, and invite comments from members.</p> <p>Future work committed to by ERA:</p> <ul style="list-style-type: none"> Additional work to update groundwater models. <p>Surface water modelling to be undertaken by external experts.</p>
18/11/16	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	<ul style="list-style-type: none"> None minuted 	<ul style="list-style-type: none"> None minuted
11/11/16	CCWG meeting 8 2016	CCWG members	All closure criteria.	<ul style="list-style-type: none"> Landform: SSB requested validation process for modelling, suspended sediment criteria will only be possible to monitor following the completion of active management as ERA will be actively trapping sediments (therefore turbidity is not a true reflection of erosion). ERA disagreed. Water and sediment: Discussion over the use of decision trees to demonstrate that objectives are met. <p>Fauna and flora: weed criteria wording to be modified. Further work required regarding fauna criteria. SSB is not satisfied with the current wording of ground cover criteria.</p>	<p>Each organisation to send interpretation of ER 1.1(d) and 1.2(d) to DIIS along with any other ER where there is a material difference of interpretation.</p> <p>Email overview of the ERA closure risk assessment to CCWG.</p> <p>ERA to discuss radiation criteria with SSB and finalise.</p>
28/10/16	CCWG meeting 7 2016	CCWG members	Update on development of closure criteria all themes.	<ul style="list-style-type: none"> Cultural criteria: All the cultural health index criteria have been updated to match that proposed by GAC, the visual connection criteria has been added and a criterion on plant available water has been included in the flora and fauna table. Water criteria: have been modified to include decision trees. The criteria for 'on the Ranger Project Area' have also changed to that requested by SSB in the Sept 30 meeting to be an 'As Low as Reasonably Achievable' (ALARA) assessment. Finally, wildlife drinking water criteria have been removed following a risk assessment process that has been presented in the closure plan. 	ERA to meet with GAC and NLC to review criteria proposed by GAC.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
13/10/16	CCWG meeting 6 2016	CCWG members	<ul style="list-style-type: none"> Interpretation of ER 1.1(d) and 1.2d. Update on development of flora and fauna criteria. Update on development of landform criteria. <p>Interpretation of ER 1.1(d) and 1.2 (d) is ongoing regarding the definition of detrimental impact.</p>	<ul style="list-style-type: none"> Interpretation of ER 1.1(d) and 1.2d: Each organisation to send interpretation of ER 1.1(d) and 1.2d to DIIS along with any other ER where there is a material difference of interpretation. Update on development of landform criteria: generally accepted by all present 	Two new cultural criteria added. These relate to plant/water holding capacity and soil edaphic features.
30/09/16	CCWG meeting 5 2016	CCWG members	<ul style="list-style-type: none"> Uncertainty in construction of the landform Update on water and sediment closure criteria – health, ecosystem protection on and off the RPA, wildlife drinking water. Update on cultural closure criteria 	<ul style="list-style-type: none"> Uncertainty in construction of the landform: uncertainty in the landform construction is approximately 1-2 metres. This uncertainty relates to the swell factor that will occur during reclamation and placement of waste rock. Uncertainty may require small changes to topography that will be made in areas that will not impact on the drainage or erosion characteristics. Update on water and sediment closure criteria: <ul style="list-style-type: none"> Health – accepted as a good framework for progression. Noted that some metals are already higher than tolerable intake levels via natural processes ecosystem protection off the RPA – confusion existed over the interpretation of the outcome. Disagreement between SSB and ERA as to the location where the highest level of protection is applied, the confluence of Magela and Gulungul Creeks or the section of Gulungul Creek between the Gulungul Creek lease boundary and the confluence. Ecosystem protection on the RPA - Disagreement between SSB and ERA reading the application of ALARA to species protection on the RPA wildlife drinking water- discussion regarding the purpose for the criteria on wildlife drinking water. 	All to review proposed cultural criteria and provide comments back to GAC

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
15/09/16	CCWG meeting 4 2016	CCWG members	<ul style="list-style-type: none"> Closure plan progress update and content review Best Practicable Technology (BPT) overview Criteria for each theme Groundwater abstraction restrictions 	<p>Criteria: general discussion on each criterion</p> <ul style="list-style-type: none"> Radiation - Clarification needed on screening levels vs final value for assessment; SSB to finalise. Landform – what is the acceptable level of error for landform execution, centimetres or metres? ERA to clarify. Water and sediment – discussion around the wording and effects to wildlife from sumps. SSB request that there is no detrimental affect however ERA state that this is not possible. Flora and fauna: further work required on the impact of fire. Soils: noted that soils criteria only apply to contaminated soils. Nutrient cycling and other soil properties pertaining to the development of a sustainable ecosystem are included in flora and fauna criteria <ul style="list-style-type: none"> Cultural criteria: GAC to review and provide comments. 	<ul style="list-style-type: none"> ERA to discuss radiation closure criteria with SSB and finalise ERA to clarify the uncertainty in landform construction that is likely and place this into the landform CC ERA to present on the status of water and sediment closure criteria at the next meeting. <p>ERA to present on the status of Flora and Fauna closure criteria at the next meeting.</p>
08/09/16	ARRAC 46	ARRAC members & observers	<ul style="list-style-type: none"> ERA presented an overview of closure planning and stages. 	<ul style="list-style-type: none"> The drivers of rehabilitation relate to the things that are protected in the Alligator Rivers Region. Surface water is the main pathway of contamination so a set of water quality limits have been established to denote levels of contaminants that are considered acceptable. Considerable additional work is also occurring on predicting the effects of the rehabilitated landform on the surrounding environment. Groundwater is the main pathway in the situation and modelling have been focusing on Pit tailings and peak solute loads. The models apply for ten thousand years but become quite coarse the further out you go, so more detailed modelling is current ion development to show how ground and surface water will interact. Closure criteria describe a target. More challenging ids describing the pathway to that target, how the landform will perform and the implications for vegetation etc. SSB's entire focus is now on these matters. 	<ul style="list-style-type: none"> None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
01/09/16	CCWG meeting 3 2016	CCWG members	<ul style="list-style-type: none"> Closure risk assessment presentation Closure strategy and schedule Objectives and outcomes all closure themes Reporting of closure activities	<ul style="list-style-type: none"> Closure Risk Assessment Presentation: high risks (Class 3) highlighted. Some risks required further studies as the controls are ranked as less effective. Closure strategy and schedule: general discussion regarding the extent that the closure plan covers all closure applications and approvals. Issue to be raised with MTC. Objectives and outcomes all closure themes: Objectives for each theme were discussed. <ul style="list-style-type: none"> To avoid duplication, tailings outcomes are to be reviewed for incorporation into other outcomes. Flora and fauna outcomes have been changed to align to the ER objective Soils are to follow the general NEPM process Outcomes for the cultural criteria have been taken from the Murray Garde report and cultural health indices. Cultural criteria will be a subjective, not objective measure. Reporting of closure activities: ERA to provide regular update on closure progress, with parameters, to the MTC.	<ul style="list-style-type: none"> Findings from the closure feasibility study scheduled to commence in September 2017, will be incorporated into future iterations of the Ranger Mine Closure Plan. The Ranger Mine Closure Plan, provides a table of additional closure applications and approvals appended to Chapter 1. Chapter 6, provides the most up-to-date view based on current knowledge, studies and stakeholder feedback.
09/09/16	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	<ul style="list-style-type: none"> Supervising scientist is drafting Rehabilitation Standard for Ranger. SS is also drafting an associated Communication Strategy. There was discussion of the roles of SS and other stakeholders regarding the final approval for closure by the Australian Government under the <i>Atomic Energy Act 1953</i> (Cth). There was also discussion on the process to review future closure plans and site relinquishment. 	<ul style="list-style-type: none"> It was proposed to rename the overarching Closure Criteria Working Group. This will require a change in the terms of Reference of the working group. GAC to consider the issue further and report back.
19/08/16	CCWG meeting 2 2016	CCWG members	<ul style="list-style-type: none"> Closure plan review and update Update on progress of criteria development SSB rehabilitation standard	<ul style="list-style-type: none"> Closure plan: outline of plan presented with a matrix of closure milestones. ERA seeking endorsement of the steps listed in the milestone matrix. General discussion around the feasibility study, scheduled to commence 2017. Closure Criteria development: Most TWGs are progressing well. SSB rehabilitation standards: Draft of SSB rehabilitation standards are being progressed, due in September 2016. 	<ul style="list-style-type: none"> Closure plan: The closure feasibility study is scheduled to commence September 2017. Findings of the feasibility study to be incorporated into later iterations of the closure plan. Closure criteria development: The Ranger Mine Closure Plan, Chapter 6, provides the most up-to-date view based on current knowledge, studies and stakeholder feedback. SSB rehabilitation standards: Draft rehabilitation standards for radiation dose (humans), radiation dose (environment), magnesium, uranium and manganese surface water were issued to stakeholders for initial feedback on 1 August 2017.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
05/08/16	Flora and fauna TWG	FFTGW members	<ul style="list-style-type: none"> Discussion on the flora and fauna closure criteria, particularly species composition, canopy architecture, tree distribution, weed composition and abundance, and fauna 	<ul style="list-style-type: none"> Species composition: Requires further discussion with run further scenarios given <i>Eucalyptus miniata</i> does not have a high success rate on TLF but <i>Corymbia foelschiana</i> fills the niche. Canopy architecture: Needs to include a canopy cover and ground cover index within the range of the natural analogue sites. Dependent on the water retention in the soils. Weeds: Needs to include introduced species not just declared spp. For example, annual <i>Pennisetum sp.</i> and red natal <i>Melinis repens</i> are both major issues on the RPA, but neither are declared species. Fauna: Presence/absence is not strong enough. TWG must be able to established measurements. 	<ul style="list-style-type: none"> These emerging issues are addressed in the Ranger Mine Closure Plan, Chapter 6, Section 6.5.
26/06/16	Closure criteria water and sediment TWG meeting 2016-02	CCTWG members	<ul style="list-style-type: none"> Magnesium field effects data to set closure criteria Guideline values for drinking water, wildlife, recreation and livestock <p>Science supporting local toxicity guideline values</p>	<ul style="list-style-type: none"> Magnesium field effects data to set closure criteria: SSB have not yet delivered their SSB Mg field effects paper. Guideline values for drinking water, wildlife, recreation and livestock: All guideline values are compared against all water types. Suggestions put forth to improve the closure plan in regards to water. Science supporting local toxicity guideline values: SSB to supply information on ecotoxicology guideline values and confidence intervals from the species sensitivity distribution curves and assess what information can be supplied on the confidence in field threshold effects GV 	Emerging issues continue to be addressed in iterations of the Ranger Mine Closure Plan. The Ranger Mine Closure Plan, Chapter 6, Section 6.4 provides the most up-to-date view based on current knowledge, studies and stakeholder feedback.
06/06/16	Closure criteria water and sediment TWG meeting 2016-01	CCTWG members	<ul style="list-style-type: none"> Develop a report for each COPC for which closure criteria are being recommended. Relevance of KKNs to closure criteria. Potential generation of acid sulfate sediments and subsequent environmental consequences Nutrients from tailings/ process water (NH₃) and explosive residues in waste rock (NO₃). Herbicides, hydrocarbons and other metals. 	<ul style="list-style-type: none"> Magnesium in surface waters: Discussion on use of field and laboratory tests to derive a guideline value for ecosystem protection for magnesium in surface waters. SSB to provide a report of science underpinning Mg closure criterion. Uranium in surface waters: Discussion on appropriate U limit for surface waters taking into account the binding nature of dissolved organic carbon and expectations of traditional owners. SSB to provide report on science underpinning proposed uranium closure criterion. Total Ammonia Nitrogen: Discussion on need for closure criterion for TAN given its high variability in nature. SSD to provide finalised paper to TWG. Turbidity: Discussion on the use of drinking water guidelines to devise a limit for turbidity. Stakeholders also provided comment on nutrients from tailings and metals 	<p>Emerging issues continue to be addressed in iterations of the Ranger Mine Closure Plan. The Ranger Mine Closure Plan, Chapter 6, Section 6.4 provides the most up-to-date view based on current knowledge, studies and stakeholder feedback.</p> <ul style="list-style-type: none"> Nutrients from tailings: ERA to assess and report on eutrophication risks from mine derived nutrients and suitable criteria/guidelines for preventing eutrophication if required. <p>Metals: ERA to calculate and report on predicted metal concentrations transported to surface waters from tailings and process water in closed pits.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
27/05/16	MTC	MTC members	<ul style="list-style-type: none"> An update on the Closure criteria Development Process was presented. 	<ul style="list-style-type: none"> None minuted 	<ul style="list-style-type: none"> ERA to schedule a Mine Closure Criteria working group. ERA to assemble a schedule of expected notifications and applications for closure activities.
24/05/16	Landform TWG meeting	CCTWG members	Development of suspended sediment parameters.	No minutes available	<ul style="list-style-type: none"> No minutes available
06/05/16	Flora and fauna TWG closure criteria workshop	CCTWG members	<ul style="list-style-type: none"> Reporting on revegetation species list Use of dissimilarity matrix to assess revegetation's similarity to analogue sites. Presentation and discussion on draft closure criteria. Reports on trajectory work. <p>Discussion on closure criteria for fauna.</p>	No minutes available	No minutes available
28/04/16	ARRAC 45	ARRAC, SSB, NTDME	<ul style="list-style-type: none"> Closure criteria 	None minuted	None minuted
08/04/16	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. ERA provided an updated on the Closure Criteria Development process. 	SS requested that ERA ensure the closure and operational activities are closely aligned. ERA noted.	None minuted
04/03/16	CCWG meeting 1 2016	CCWG members	<ul style="list-style-type: none"> Proposed changes to closure criteria objectives. Update on progress of closure criteria development. 	<p>Cultural criteria: discussion held about the proposed cultural criteria and appropriateness as a measure of final close out. Consensus could not be reached.</p> <p>Flora and Fauna criteria: GAC requested the inclusion of edaphic criteria as an indicator of successful rehabilitation. Flora and fauna group to consider edaphic criteria.</p> <p>SSB noted that the weeds criteria needed simplification</p> <p>Guidance and focus for TWGs: SSB asked for TWGs to focus on the purpose of the technical groups as:</p> <ul style="list-style-type: none"> Set the end state or target for the objective Develop the monitoring program or measurement method Develop the method to reach the end state <p>Expectations on closure criteria: SSB notified the group that they are firming up their position on what it expects for closure criteria.</p>	<p>ERA to update Landform, Flora and Fauna and Radiation objectives and report back to technical groups.</p> <p>ERA to check with ERISS to determine what depth should apply to radiation criteria and update parameter description.</p> <p>ERA to consult with GAC on the draft cultural health indices to determine how they would like them applied and request that Murray Garde be allowed to present on the proposed program.</p> <p>ERA to request that the flora and fauna group consider edaphic criteria.</p>
23/02/16	Landform TWG workshop	Landform TWG members	<ul style="list-style-type: none"> Setting allowable gully size for the various erosion zones. Setting criteria for other parameters. Review of landform evolution modelling results to identify areas of potential erosion and agreement on the erosion zones for monitoring and criteria setting. 	<p>Agreement could not be reached regarding allowable gully size. Two options were debated:</p> <ul style="list-style-type: none"> Some gully erosion is acceptable. Use modelling to determine gully formation location and size and then this would be the basis for the criteria and monitoring program; or <p>No gully erosion is acceptable.</p>	None minuted
12/02/16	MTC	MTC members	<p>No meetings of the Mine Closure working group had been held.</p> <p>A flora and fauna closure had been held.</p> <ul style="list-style-type: none"> A radiation landform closure criteria working group meeting was held. 	<ul style="list-style-type: none"> None minuted 	Closure criteria working group meeting scheduled for March 2016.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
11/12/15	Landform TWG meeting	Landform TWG members	<ul style="list-style-type: none"> ERA presentation on current proposed landform and general closure planning ERA overview of proposed landform criteria Discussion on the proposed measurement endpoints (outcomes or targets) Discussion of parameters of relevance to targets <p>Agreement on actions to progress</p>	<p>General agreement that landform objectives were appropriate.</p> <p>Objective 1: Maintain a stable landform that will not expose tailings through erosion processes for at least 10000 years</p> <p>Outcomes identified to address Objective 1:</p> <ul style="list-style-type: none"> Gully erosion: Landform Evolution Model to be used to identify locations of potential gully erosion and a monitoring program then developed for these areas. Land Slip: Agreement that risk is low due to flat terrain however a risk assessment will be undertaken and a monitoring program developed. Movement of Magela creek impacting toe of landform: this may cause mass movement therefore it was incorporated into the risk assessment for land slip. <p>Objective 2: Erosion characteristics of the rehabilitated landform, as far as can reasonably be achieved do not vary significantly from comparable landforms in surrounding undisturbed areas</p> <p>Outcomes identified to address Objective 2:</p> <ul style="list-style-type: none"> Sediment loads: Post-mining suspended sediment loads will temporally and spatially decrease to match background rates of the surrounding areas Bedload: Sediment or sand does not cause the accelerated infilling of billabongs with sand and silt <p>Denudation: Erosion/denudation rate is comparable to background erosion rates in 10,000 years.</p>	None minuted
30/11/15	CCWG meeting 3 2015	CCWG members	<ul style="list-style-type: none"> Overview of landform v5. Discussion around CCWG setting the closure criteria objectives. 	<ul style="list-style-type: none"> None minuted 	<ul style="list-style-type: none"> Species list needs to be agreed Review and endorse analogue work subject to timeframe Agreed to use analogue approach with variability shown by Renee work Identify the likely vegetation communities on site (3?) Structure, function, resilience - measurement parameters, then numerical values Weeds in KNP and ferals Fauna criteria <p>Preliminary work on trajectories for next meeting</p>
30/11/15	Flora and fauna TWG closure criteria workshop	Flora and fauna TWG members	<ul style="list-style-type: none"> ERA presentation on the status of current closure planning. ERA presentation on ecosystem re-establishment and species list. Discussion on proposed measurement endpoints. Identification of future actions to obtain agreement on measurement endpoints. 	None minuted	<ul style="list-style-type: none"> None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23-25/11/15	ARRTC 35	ARRTC members & observers	<ul style="list-style-type: none"> INTERA update on groundwater modelling and response to the perceived knowledge gaps in groundwater research. Outline of the current closure schedule. Development of cultural health indices criteria Ranger post closure land use statement Coonjimba Billabong ASS risk assessment 2015 sampling analysis of U concentration in LAAs collation and description of water quality re-vegetation monitoring. Summary of the KKN requirements for the critical and high risks for the ecological risk assessment. 	<ul style="list-style-type: none"> INTERA update: SSB agreed to consider making surface flow and water quality data sets available to INTERA subject to a formal request from ERA. Magela Creek: Addressed by INTERA in the site wide model due for completion in early 2016. It was also noted that INTERA have reported that sensitivity studies indicate that the current model is insensitive to changes in the hydraulic conductivity of the Magela sand bed. Ongoing from ARRTC 32. Seismic events: Minutes from FEPS workshop indicated there had been a discussion which had led to agreement that seismic events were not an issue for Ranger rehabilitation. ARRTC suggested work should be done to quantify the risk based on historical records and given the mine is sitting on the edge of a regional fault zone and seismic activities have potential to influence overland and sub-surface flows; then note that seismic events cannot be mitigated. <p>ERISS advised that the conceptual models for the risk assessment had captured seismic events.</p>	<ul style="list-style-type: none"> Seismic Events: ERA noted that the issue of seismic events was assessed as "low" in the context of the disposal of tailings in Pit 3. Tailings were being buried in a pit, and an assessment had identified this as best practice and the Ranger Authorisation had been updated to require this. The landform will be built to the required standards; ERA queried the justification for doing additional work to quantify the risk of an earthquake when there are no additional mitigations that can be adopted to protect against such an event. <p>ERA advised that a 1997 study had looked at extreme events in the ARR. The relevant section of the report would be provided to ARRTC members. Ongoing.</p>
13/11/15	MTC	MTC members	<ul style="list-style-type: none"> No meetings of the Mine Closure working group had been held. 	<ul style="list-style-type: none"> Supervising scientist requests that ERA reconvene working groups with more project management, resources and personnel assigned. There was discussion on the process of producing closure criteria and the requirement of working groups and closure criteria. One day workshops are proposed for each working group prior to closure. 	<ul style="list-style-type: none"> Two workshops are proposed prior to the end of December 2015.
10/09/15	MTC	MTC members	Report from Mine Closure working group presented.	<ul style="list-style-type: none"> None minuted 	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
09/09/15	ARRAC 44	ARRAC members & observers	<p>Overview of \$400 M spent on rehabilitation to date, including:</p> <ul style="list-style-type: none"> Installation and commissioning of the brine concentrator. Outline of the \$30 M rehabilitation spend forecasted for 2015. Transfer line for tailings from the mill to Pit 3. Pumping system for dewatering of Pit 3. Progress on the Pit 1 capping – the majority of the pit has a lateritic cover, remainder of capping within the next two months; bulk backfill and subsequent revegetation will commence in 2017, pending approvals. Completion of civil works in Pit 3 to allow the pit to receive tailings and process water, including the installation of a horizontal bore that will be used to extract seepage and the installation of reinjection bores for storage of process water brines. Impending commissioning of brine injection bores. <p>Launch of tailings dam dredge; now in the commissioning phase. These accomplishments collectively form the last steps towards implementation of the ITWC management processes that will be required for mine closure. The dredge is estimated to move 5-6 Mt of tailings each year to 2020, which will enable final consolidation of material in Pit 3 prior to closure and rehabilitation.</p>	Minutes not available	Minutes not available
12/08/15	CCWG meeting 2 2015	CCWG members	<ul style="list-style-type: none"> Discussion on ERA proposed closure criteria. 	None minuted	None minuted
17/07/15	CCWG meeting 1 2015	CCWG members	Update on plan to progress closure criteria.	<ul style="list-style-type: none"> Tier 2 project: SSB announced it will be setting up a Tier 2 project on Ranger Closure. Tier 2 is a mid-level project that requires regular reporting to the Executive Board. SSD will be getting a resource to establish this project. It will be requiring regular updates from ERA on the progress of closure criteria development. New purpose for TWGs: Agreement that the TWGs would now be used for the review of tabled criteria. <p>Coonjimba billabong: KT noted that SS has some questions about the fate of Coonjimba billabong. It has been historically subjected to sedimentation during construction and is now a lot shallower than pre-mining and there are notable acid events. The question was asked if GAC could provide feedback as to what would be an acceptable state for this billabong on closure.</p>	<p>Prepare SOW for TWG and circulate before next CCWG meeting</p> <p>Obtain clarification from SS of the questions to be asked regarding the billabong then organise appropriate consultation with the Mirarr (through Murray Guard if needed)</p>
10/07/15	MTC	MTC members	Report from Mine Closure working group presented.	<ul style="list-style-type: none"> None minuted 	None minuted
22/05/15	MTC	MTC members	Report from Mine Closure working group presented.	None minuted	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
18-20/05/15	ARRTC 34	ARRTC members & observers	<ul style="list-style-type: none"> ITCW closure roadmap including information on 8 closure strategies and 4 main options. Update on the installation of the wicks in Pit 1 and preloading. Update on the arrival of the tailings dredge. Pit 3 rehabilitation and the construction of the underfill. Progress of the tailings and brine management project and various strategies. Outcomes based on 113 years of climate data on soil water deficit and plant available water. Closure/rehabilitation related knowledge requirements and outline of the current closure schedule. <p>Outcomes of the environmental risk assessment.</p>	<ul style="list-style-type: none"> Regional groundwater: Supervising Scientist and ERA to ensure the regional groundwater context is explicitly addressed and considered as part of proposed review of KKNs next meeting Magela Creek subsurface profile: Supervising Scientist and ERA to keep ARRTC informed on identification of appropriate methodologies to investigate subsurface profile of Magela Creek sand channels and assess potential for solute migration. <p>Seismic events.</p>	<ul style="list-style-type: none"> Regional groundwater: Completed. Magela Creek subsurface profile: ERA advised the report is still in draft but the recommendations had been considered as part of recent sediment work. Report to be circulated once finalised. Ongoing. <p>Seismic events: ERA to provide ARRTC with the basis on which seismic events were excluded from the risk assessment process. See response under ARRTC 35.</p>
21/04/15	ARRAC 43	ARRAC members & observers	<ul style="list-style-type: none"> Pit 1 closure works, including rock preload and laterite capping, prior to bulk backfill, landform shaping and rehabilitation. Pit 3 closure preparation works, including backfilling and related civil works to enable tailings deposition. 	<ul style="list-style-type: none"> GAC sought 'stronger' reassurance from ERA regarding the security of future funding for rehabilitation of Ranger. 	<ul style="list-style-type: none"> Since 2012, ERA has invested over \$425 m in rehabilitation and water management projects, to meet statutory mine closure requirements and stakeholder expectations.
10/04/15	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	Discussion was on the objectives and priorities of various closure criteria.	None minuted
13/02/15	MTC	MTC members	Report from Mine Closure working group presented. Update on Pit 1 and Pit 3 presented.	None minuted	ERA to provide DME with further information on mine closure criteria working group
10/12/14	Closure criteria water and sediment TWG meeting 2014-05	CCTWG members	<ul style="list-style-type: none"> Discussion paper on detrimental impact. Update on diet review Update on cultural values and criteria. Discussion paper on the recommended closure criteria for Objective 3 for water and sediment theme. <p>Drinking water, recreation and wildlife drinking water criteria.</p>	<ul style="list-style-type: none"> Detrimental Impact: presentation by SSB on the term 'detrimental impact'. SSB position is that any change detected in the biological program is a detrimental change. To be applied outside of the RPA. All TWG members to review paper. Discussion paper – closure criteria for water and sediment theme: Discussion paper supplemented with a presentation on turbidity criteria. Discussion revolved around monitoring frequency. Frequency will be informed by modelling predictions. Turbidity pH and sedimentation in Coonjimba Billabong 	<ul style="list-style-type: none"> Detrimental Impact: Definition is currently being addressed by consultants BWT WBM. Turbidity criteria to be developed for sediment load and turbidity in the water column in billabongs and creeks. ERA and SSB to compile information on Coonjimba Billabong water quality. <p>MI to follow up with Murray to prioritise sharing updated diet information earlier than report finalisation.</p>
07/11/14	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. Update on Pit 1 and Pit 3 presented. Murray Garde has completed consultation with Mirarr and will submit a report in December 2014. Flora and fauna technical working group to commence prior to 2015. 	<ul style="list-style-type: none"> None minuted 	<ul style="list-style-type: none"> None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
04-06/11/14	ARRTC 33	ARRTC members & observers	<p>Updates on the following ERA and collaborative closure studies:</p> <ul style="list-style-type: none"> Overview of CCWG recent work and outputs. Status of groundwater solute transport modelling indicating negligible flow going through the deep bedrock system, suggesting no need for concern that linear faults with enhance transport of solutes. 5th year of erosion and chemistry studies on the trial landform confirming rapid decline in material leaving the site post construction. Revised direction and work plan for aquatic ecosystem establishment. <p>Outline of the key 14 steps associated with Ranger's revegetation strategy, and the learnings and risks associated with each of the 14 steps.</p>	None minuted	None minuted
03/11/14	Closure criteria water and sediment TWG meeting 2014-04	CCTWG members	<p>Technical presentations including:</p> <ul style="list-style-type: none"> Review of operational water quality monitoring parameters, method and trigger values. Parameter review, predicted metal loads from Pit 3. Annual additional load limits (AALL) and dietary intake review for metals. Sediment baseline review. Water quality closure criteria. Toxicity and guideline values for U in billabong sediments. Toxicity of NH₃ in local freshwater biota. 	<p>Additional Annual Load Limits (AALL) and dietary intake review for metals:</p> <ul style="list-style-type: none"> All agreed that the 1985 approach for diet assessment and AALL for metals and radionuclides is no longer appropriate Concentration criteria appear to be more restrictive than AALL except for manganese. Supervising Scientist agreed to remove or review the diet based AALL in the Authorisation. Query raised as to whether the background diet for the BRUCE database is not influenced by mining in last 30 years. Evidence required that this is the case. Toxicity and guideline values for uranium in billabong sediments. <p>Discussion paper to be produced describing the data and providing recommendation on approach and value to adopt for interim closure criteria.</p>	None minuted
17/10/14	CCWG meeting 2 2014	CCWG members	<ul style="list-style-type: none"> TWG updated on landform. Water and sediment TWG update. 	Landform TWG proposed to separate two distinct phases in landform objectives into two criteria, landform design based criteria and landform monitoring based criteria.	None minuted
12/09/14	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. Update on Pit 1 and Pit 3 presented. 	None minuted	None minuted
09/09/14	ARRAC 42	ARRAC members & observers	<p>Closure planning update:</p> <ul style="list-style-type: none"> Pit 3 initial backfill is nearing completion: 8.3 Mt of waste material moved during the first half of 2014 taking the total to 31.1 Mt at end of June 2014. Tailings management work progressing on schedule and budget. <p>Brine concentrator meeting water quality specifications and throughput has progressively increased.</p>	None minuted	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
15/08/14	Closure criteria water and sediment TWG meeting 2014-03	CCTWG members	<ul style="list-style-type: none"> Defining terms such as parameter, measurement endpoint, criteria. Report on all candidate ecological processes (from world literature). Defining "change". Considering water quality measures and points – e.g. spatial variations billabong v creek. 	<ul style="list-style-type: none"> Defining change: TWG reminded that change definitions are covered in the discussion paper Acceptable Limits of Change/Detrimental Impact that was previously distributed to the TWG. TWG has been asked to use the Limits of Acceptable Change approach when developing criteria. Water quality comparative measures: spatial and temporal differences discussed such as stream vs billabong and wet season vs dry season. Measurement methods of concentration vs load were discussed. Water quality values: discussion regarding the information to be compiled in table format to assist in the decision-making process on water quality criteria. <p>COPC from tailings and brine: Current solute transport models for the tailings and brine do not include predicted loads and concentrations of metals. ERA to calculate the predicted loads and concentrations from the pit tailings and brines based on current solute models. Compare the predicted concentrations and loads to ecosystem protection data and appropriate health limits.</p>	<p>SI to check with SP if Murray Guard is asking TOs about drinking water sources.</p> <p>Road test approach on Mg from Pit modelling.</p> <p>ERA to consult an expert on Manganese dietary risks</p> <p>ERA to provide predictions of loads and concentrations of the metals that are identified (Brown et al 1985) as being of mill or ore origin and compare the prediction concentrations and loads to ecosystem protection data and appropriate health limits.</p> <p>Communicate compiled information supporting the biological effects data and recommendations for criteria.</p>
14/08/14	CCWG meeting 1 2014	CCWG members	<ul style="list-style-type: none"> Industry comments on closure criteria objectives and agreement on changes to <i>"Detrimental Environmental Impact"</i> paper. Acceptance of report as starting point for progression by the TWG closure criteria report. Update on TWGs; presentations from water and sediment TWG. 	<ul style="list-style-type: none"> Detrimental Environmental Impact: ERA presented a paper proposing the use of the RAMSAR wetland "limits of acceptable change" as a way to incorporate the scientific and cultural/social aspects into a measurable outcome. Paper put forward as a 'starting point' and referred to the water and sediment TWG for progression. Closure Criteria Report: Discussion surrounding the need for groundwater criteria and a groundwater monitoring program. Water and Sediment Group points of discussion: Natural acid events in creeks and billabongs mobilising solutes stored in sediments originating from the rehabilitated landform The use of load limits or concentrations to enable comparison between modelling output 	<p>Update the closure objectives to include comments from Industry.</p> <p>Final comments on the detrimental impact paper to be sent to ERA.</p> <p>Incorporate relevant cultural criteria work conducted by Murray Guard into the detrimental impact paper before finalising.</p> <p>update the closure criteria report to include more details on groundwater being used as a means to confirm that model predicted are on the predicted trajectory.</p> <p>Assess potential for impact of water quality from sediment loads form the landform.</p> <p>Update last water and sediment objective to replace "ecosystem function" with a more appropriate term.</p> <p>Review the diet implications for the AALL suit, including historically removed values, to be in line with the most recent diet and data collected by ERISS</p> <p>Conduct more research into the Mn human health effects to obtain a better indication of risk.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
14/07/14	Closure criteria water and sediment TWG meeting 2014-02	CCTWG members	<ul style="list-style-type: none"> Standardisation of ecological nomenclature. Preparation of recommended interim water quality criteria for Magela Creek and Coonjimba Billabong. Seeking feedback on acceptable limits of change discussion paper. Review of risk assessment models an output for Pit 3 closure interim criteria. Review of constituents of potential concern (COPC) 1985 to present. 	<p>Water quality limits and contaminants of concern for Magela Creek were presented to group by ERA</p> <ul style="list-style-type: none"> 	Standardisation of ecological nomenclature referred to CCTWG for interpretation.
11/07/14	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. Update on Pit 1 and Pit 3 presented. 	None minuted	None minuted
17/06/14	Closure criteria water and sediment TWG meeting 2014-01	CCTWG members	Kick-off meeting for the TWG outlined 6 objectives and 7 specific tasks. Agreement on endpoints, interpretation of ERs, for example on quality of rehabilitation of the site needed for inclusion into KNP, evidence of decisions to support recommendations to the CCWG and MTC.	<ul style="list-style-type: none"> Discussion of closure and approvals timelines relevant to water and sediment criteria. Interpretation of environmental requirements including the spatial extent to which the criteria will apply. All members to review the Limits of Acceptable Change paper which includes the spatial context of interpreting the ERs TWG agreed on the following priority tasks in order to progress the Pit 3 application. These were: <ul style="list-style-type: none"> Determining measurement endpoints <p>Setting parameter values and trajectories</p>	<p>Inconsistent terms used in the objectives eg: “ecological values” in Objective 3 versus “ecological function” in Objective 6 (slide 6). Seek direction from CCWG on interpretation of these terms.</p> <p>Prepare presentation recommending interim WQ closure criteria for Magela Creek and CB billabong. Include references and rationale in notes panel of presentation so it can act as a standalone report.</p> <p>Review risk assessment models and outputs when developing presentation for Pit 3 closure interim criteria for next meeting.</p>
09/05/14	MTC	MTC members	Report from Mine Closure working group presented. Draft version of detrimental impact was sent out to MTC members.	<p>None minuted</p> <ul style="list-style-type: none"> 	MTC to respond with comments to the draft version of detrimental impact definition.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
07-08/05/14	ARRTC 32	ARRTC members & observers	<p>Updates on the following ERA and collaborative closure studies:</p> <ul style="list-style-type: none"> ITWC study including: Pit 1 preload and capping; outcomes of the monitoring of the barrier integrity. Prioritisation of key environmental studies to inform closure criteria. Interpreting “detrimental environmental impact”. Rehabilitation-closure risk assessment outcomes and initial implications for KKN revisions. Water retention capacity of waste rock substrate to support a functional tropical woodland. <p>Natural colonisation and seasonal responses of emergent aquatic plant in constructed sumps.</p>	<ul style="list-style-type: none"> Magela Creek: appropriate methodologies to investigate subsurface profile of Magela Creek sand channel and assess potential for solute migration. Also discuss rationale and recommendations with SSB. Groundwater modelling: sensitivity Pit 3 closure Water retention of waste rock Emergent aquatic plants: ERA/SSB to run a workshop prior to ARRTC 33 to determine the types of water bodies that need to be assessed, what are the risks, what is known, what are the knowledge gaps and the applicability of the sumps to studies. Risk assessment: ERA to run a qualitative risk assessment process for decommissioning. 	<ul style="list-style-type: none"> Magela Creek: ERA to identify appropriate methodologies to investigate subsurface profile of Magela Creek sand channel and assess potential for solute migration. Also discuss rationale and recommendations with SSB. Addressed during ARRTC meeting 35 – INTERA presentation. Groundwater modelling: ERA to advise if modellers are exploring the sensitivity of the model to geological structures using broad (i.e. hydro stratigraphic unit wide) variations in hydraulic conductivity, or are they looking at preferential flow through linear structures as well? If not, what has been done to systematically assess the presence and characteristics of linear geological structures to act as a potential transport pathway for contaminants to the surface? Completed and addressed further with presentation by INTERA during ARRTC meeting 33. Pit 3 closure: ERA to draft and distribute a table of contents for Pit 3 tailings application in addition to making early input data available to members. Completed. Water retention of waste rock: : ERA to provide update on the implications of eco-hydrology study for Pit 1, including advice on how to explore lessons for Pit 1's future. Completed. Addressed during ARRTC meeting 34 via ERA presentation. Emergent aquatic plants: completed prior to ARRTC meeting 33. <p>Risk assessment: Ongoing ARRTC meeting 34.</p>
09/04/14	ARRAC 41	ARRAC members & observers	<p>Closure planning update:</p> <ul style="list-style-type: none"> Progress on the backfilling of Pit 3 ahead of schedule. Completion of the ITWC study which outlines the optimal rehabilitation plan for the RPA. 	<ul style="list-style-type: none"> GAC and NLC comfortable with statuses of Pit 1 rehabilitation. Australian Conservation Foundation sought clarification regarding a statement in the ERA 2013 Annual Report that was interpreted as linking approval of R3D as a prerequisite for rehabilitation of the RPA. GAC and Environment Centre NT (ECNT) queried sufficiency of funding for rehabilitation. <p>ECNT tabled report titled 'Reconsidering Ranger – a brief on social, environmental and economic cost of uranium mining in Kakadu'.</p>	<ul style="list-style-type: none"> R3D Statement: The wording of the statement interpreted to link R3D approval to successful rehabilitation could not be clarified during the meeting. However, the Ranger 3 Deeps project and infrastructure was placed into care and maintenance in June 2015, following the ERA board decision that the project should not proceed to final feasibility study in the current operating environment. Rehabilitation Funds: Commonwealth Department of Industry and NT Department of Mines and Energy responded to bond queries. The different types of bonds were clarified and assurances provided to GAC that the departments were satisfied with the value of the bonds.

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
28/03/14	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. Update on Pit 1 and Pit 3 presented. 	<ul style="list-style-type: none"> None minuted 	<p>Draft version of detrimental impact definition has been completed – ERA will circulate to MTC.</p> <ul style="list-style-type: none"> MTC to respond with comments to the draft version of detrimental impact definition.
17/02/14	MTC	MTC members	Report from Mine Closure working group presented. Update on Pit 1 presented.	None minuted	Draft version of detrimental impact definition has been completed – ERA will circulate to MTC.
27-28/11/13	ARRTC 31	ARRTC members & observers	<p>Updates on the following ERA and collaborative closure studies:</p> <ul style="list-style-type: none"> Status of ITWC study activities for 2014, including: Pit 3 initial fill, tailings transfer and brine management, Pit 3 preload, seepage studies and associated engineering designs, progressive rehabilitation works on LAAs. Status of Pit 1 preload and validation of consolidation predictions, and wick performance. Status of the Pit 3 underfill for subsequent brine management. Tailings and brine management project- Phase 1. Update on Phase 1 (problem formulation) of the ecological risk assessment. Water quality closure criteria (for natural water bodies) adjacent to Ranger. Revegetation focussing on MLAA's remediation strategies. Groundwater and solute modelling around Pit 1 and Pit 3. Implications for surface water from the Pit 3 groundwater modelling. Key findings of the Pit 1 contaminant transport modelling. <p>Status of planning and scientific knowledge for development of closure criteria and trajectories.</p>	None minuted	ERA and SSD to provide an update on the status of the development of closure criteria (including trajectories). Addressed during ARRTC meeting 32.
15/11/13	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	None minuted	None minuted
03/10/13	CCWG meeting 4 2013	CCWG members	<ul style="list-style-type: none"> Final comments and agreement on closure criteria objectives Final comments and issues of TWG scope of works. Update of closure project priorities. 	<ul style="list-style-type: none"> Closure criteria objectives Phrasing of water and sediment objectives discussed particularly in reference to the risks to fauna when drinking on site water and the impact of creek and billabong sediment loads on ecological function. Cultural objectives require further consultation. 	<p>It was agreed that SP will update and send out the objectives for final agreement out of session, this item will all be progressed under the current open action items.</p> <p>The SOW document will be updated and sent out with a table of comments received and how they have been addressed.</p> <p>Final comments and confirmation on both the objectives and SOW required in 2 weeks to enable the TWG to start work.</p> <p>CH to provide further details of higher level information required to be included in the scopes of work.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
17/05/13	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	<ul style="list-style-type: none"> None minuted 	None minuted
06/09/13	MTC	MTC members	Report from Mine Closure working group presented. The working group has developed the scope of work for the technical working groups for each theme.	None minuted	None minuted
05/09/13	ARRAC 40	ARRAC members & observers	<p>Closure planning update (Pit 1):</p> <ul style="list-style-type: none"> Preload of rock fill has been approved but the final height of consolidation is still to be determined. Preload will assist with model validation and enable a better understanding of how closely current models are representing reality. ERA is strongly committed to determining a final consolidation level which is acceptable to stakeholders. <p>Pit 1 rehabilitation marks the beginning of a broader scale rehabilitation approach across the site.</p>	None minuted	None minuted
16/07/13	CCWG meeting 3 2013	CCWG members	<ul style="list-style-type: none"> Update on closure criteria objectives, including risk assessment conceptual models. Update of closure project priorities; outline of the scope of works for the TWGs. Update on ecosystem trajectories. 	<ul style="list-style-type: none"> Water and sediment objectives: Drinking and recreational water use values used instead of ecological values as drinking and recreation will also be values applicable to the area. Fauna objectives: recommendation from SSB to reference stock drinking water values. Radiation objectives: recommendation from SSB that wording is changed to clarify that radiation exposure is ALARA rather than applying dose limits. Closure project priorities: general consensus with draft outline. TWG: technical working groups to be kept small. Ecosystem trajectories: SSB clarified the two types of ecosystem trajectories as: Management trajectory to track progress towards achieving criteria. Trajectory to track progress to a point before achieving the objective as the final objective will not be achieved within a reasonable timeframe <p>Definition for ecosystem trajectories are to be developed by ERA.</p>	<p>Include explanation of water and sediments objectives (as discussed at meeting) in technical working group SOW</p> <p>Provide comments on the objectives and SOW to ERA in 2 weeks</p> <p>Update project list with comments from meeting and add conditional formatting to highlight lagging projects.</p> <p>Develop project Gant chart for closure projects.</p> <p>Develop definition of trajectories and other higher level issues for inclusion in SOW</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
21-22/05/13	ARRTC 30	ARRTC members & observers	<ul style="list-style-type: none"> Update on ITWC study looking at the best options for solving tailings and water disposal and mitigating associated impacts; preparation of Pit 3 for the successful rehabilitation of the tailings dam. Update on research informing the development of closure criteria for agreed themes: Landform, radiation, water and sediment, flora and fauna and soils. Update on aquatic ecosystem proposal. Status of Pit 1 rehabilitation and final landform. Outcomes of the collaborative Ranger closure ecological risk assessment workshop. 	<ul style="list-style-type: none"> ITWC PFS: ARRTC commended ERA on the high quality of their scientific work and presentations to this meeting. Ecological risk assessment: ARRTC requested that a status report (including the results from the screening phase) be provided to next meeting. Groundwater: ERA asked to provide an update on groundwater modelling activities (including associated boundary conditions) to next meeting. Revegetation: ERA asked to present on the eco-hydrology research, status (and scientific basis for) the proposed vegetation strategy and closure trajectories. Landform: ERA and SSD asked to provide an update on the status of erosion modelling for Ranger. 	None minuted
02/05/13	Technical workshop	MTC members, CSIRO, Geoscience Australia, ATC Williams, Rio Tinto T&I	<ul style="list-style-type: none"> Technical workshop on Pit 1 closure and subsequent submission of a notification on 17/05/13 for the Pit 1 preload phase. 	<ul style="list-style-type: none"> DPIR (former DME and supervising authority) could see no obvious show stoppers with pre-loading. 	Consensus from the technical workshop attendees that the pre-loading phase for Pit 1 should proceed.
24/04/13	CCWG meeting 2 2013	CCWG members	<ul style="list-style-type: none"> Update on closure project priorities <p>Update on the composition of proposed technical working groups (TWGs) for each closure criteria theme.</p>	<p>Review of changes suggested for the closure criteria report:</p> <ul style="list-style-type: none"> Groundwater abstraction: agreement by all that groundwater abstraction must be prohibited in certain areas across site Cultural aspects of landform: agreement by all to reword Objective 8 to reflect cultural aspects of water bodies, namely the requirement to ensure that the number of water bodies on site after rehabilitation be the same as before mining. <p>Sentinel wetlands: agreement by all to remove the term 'sentinel wetland' from the plan due to confusion as to its definition.</p>	<p>Include as task in the Flora and Fauna technical working group scope of works to define what is meant by "local native plant species". Also include any information received back from Ping Lu and Steve Winderlich.</p> <p>Review closure objectives to include Assessment Endpoints from conceptual model.</p> <p>Include words in the report to highlight the need for capturing the historical mining heritage and keep heritage as a theme out of scope.</p> <p>Reword landform objectives to include links to cultural aspects.</p> <p>Remove the term "sentinel wetland" from the glossary and record this decision in Appendix C</p> <p>ERA to review the project priority list with regards to U in sediment to determine if criteria will be required for Pit 1 approvals or if some modelling can be done to demonstrate these criteria will not be required</p>
22/03/13	ARRAC 39	ARRTC members & observers	<ul style="list-style-type: none"> Backfilling of Pit 3 and the ITWC PFS progressing. Rehabilitation of the Magela LAA and adjoining borrow pit is scheduled to commence this year. Planning for Pit 1 rehabilitation well advanced; over 7,000 wicks installed and preparatory works are expected to be completed by the time Pit 3 backfill is completed. 	<ul style="list-style-type: none"> None minuted 	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
15/03/13	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. The group has prioritised the formation of technical working groups for theme, with Georgetown Billabong criteria and radiological criteria as being identified as being required initially to fit in with the timeframe for projected works on site. 	None minuted	None minuted
07/03/13	CCWG meeting 1 2013	CCWG members	<ul style="list-style-type: none"> Discussion on CCWG planning for the year. Discussion on closure ecological risk assessment and development of conceptual models. 	<ul style="list-style-type: none"> Detrimental Impact: definition provided by SSD that there should be no observable biological effect as determined by an appropriately designed monitoring program. This raised further questions surrounding the definition of 'biological effect'. Technical working groups: agreement that these groups need to be formed within the next month. Key tasks include finalising objectives, reviewing the list of environmental studies and doing a gap analysis, commenting on the proposed time lines to determine if they are achievable, documentation of baseline conditions or how they can be calculated and developing the methods for determining closure criteria. <p>Ecological risk assessment and conceptual models: presentation given by ERA summarising recent workshop in conceptual models. Outcomes of risk assessments to be provided to the technical working groups.</p>	<ul style="list-style-type: none"> Technical working groups were established and have contributed significantly to the closure criteria outlined in the Ranger Mine Closure Plan, Chapter 6. The definition of detrimental impact is currently being addressed by consultants BMT WBM. Ecological risk assessment and conceptual models were developed by SSB in collaboration with stakeholders. <p>No new actions identified</p>
08/02/13	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	<ul style="list-style-type: none"> None minuted 	ERA to nominate closure criteria meeting schedule for 2013 (carried over from last meeting).
07/12/12	MTC	MTC members	Report from Mine Closure working group presented.	None minuted	ERA to nominate closure criteria meeting schedule for 2013.
05-06/12/12	ARRTC 29	ARRTC members & observers	<ul style="list-style-type: none"> Current status of studies on radiation protection of the environment (non-human biota). Recommendations from the independent surface water working group. Status of the trial rehabilitation in the Magela LAAs. Soil erosion and water quality on the trial landform. Radon exhalation from the trial landform. Update on the characterisation of groundwater flows and associated solute source strength and duration, form Pit 3 solutes to Magela Creek. Systems analysis of Ranger closure process. Developing billabong closure criteria for solutes. Potential integration of aquatic ecosystem establishment into the broader rehabilitation/closure process. <p>Overview of progressive rehabilitation pilot projects on the RPA 2012 – 2017.</p>	<ul style="list-style-type: none"> Pit 1 Aquatic ecosystems: ARRTC requested that a more detailed project proposal be provided to next ARRTC meeting. <p>Closure criteria: ERA to provide further information on the status of research informing the development of closure criteria for Ranger to next meeting.</p>	ERA to provide a presentation on Pit 1 rehabilitation status and proposed final landform to next meeting. Completed. Addressed at ARRTC meeting 30.
05/10/2012	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	<ul style="list-style-type: none"> None minuted 	None minuted

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
05/10/12	CCWG meeting 5 2012	CCWG members	Discussion on the post closure land use; defining "detrimental impact".	<ul style="list-style-type: none"> Detrimental Impact: SSD provided summary of their interpretation of the definition of 'detrimental impact'. Notes that a scientific view of impact may differ from the traditional owner's perspective. SSD will provide a written interpretation for review by the working group. <p>Technical working groups: General discussion held regarding the development of technical working groups for each closure theme.</p>	<p>Prepare a list of proposed members for each of the technical working groups and circulate to CCWG members.</p> <p>Prepare a paper outlining the scope of works for the technical working groups and send out for review by the CCWG out of session.</p> <p>Then form the technical working groups to commence work.</p> <p>Identify appropriately qualified personnel in the NT government that will be used by DME to review the technical working group findings. These people will then be added to the consultation list to make sure they are satisfied with the progress.</p>
06/09/12	ARRAC 38	ARRAC members & observers	<ul style="list-style-type: none"> Progressive rehabilitation discussed including installation of wicks in Pit 1 and application of trial landform rehabilitation successes across site. <p>ERA presented a conceptualisation of the Pit 3 brine injection and tailings management closure strategy.</p>	<ul style="list-style-type: none"> The resistance of wick installation at a depth of 20 m was discussed. 	<p>In 2012, ERA successfully installed 7,554 prefabricated vertical wick drains into Pit 1, to assist with dewatering the pit, ahead of capping and rehabilitation. The wicks were installed within the top 40 m of the tailings mass in Pit 1. The purpose of the wicks is to dewater the upper level of the tailings and promote tailings consolidation, thus establishing a stable surface upon which to commence backfill activities.</p>
27/08/12	CCWG meeting 4 2012	CCWG members	<ul style="list-style-type: none"> Discussion on the post closure land use; defining "detrimental impact". 	<ul style="list-style-type: none"> Definition of 'detrimental impact' taken from the ERs and added to the closure criteria report. SSD to review and provide a position paper. <p>Post-closure land use document tabled by GAC for review by next meeting.</p>	<p>ERA to continue the update of table 10.1 priorities and include the entire list of project required for closure criteria.</p> <p>All to review entire CC document and provide feedback by next meeting</p> <p>Update the "Post Closure land use" document and circulate for CCWG members for comment</p> <p>SSD have tabled some words to interpret what is meant by the Detrimental Impact definition in the ER's. All groups to go away and review these words and either provide comment or their own interpretation for discussion at the next meeting</p> <p>Complete Radiation section on closure criteria derivation method and circulate to working group for review and agreement. Once agreed this will then be distributed to each ERA closure criteria theme owner as the template to be used as information required.</p>

Date	Description of engagement	Stakeholders	Ranger Mine closure topics	Stakeholder comments	ERA stakeholder response, actions and/or resolution
23/07/12	CCWG meeting 3 2012	CCWG members	<ul style="list-style-type: none"> Ongoing discussion and progression of closure criteria for the RPA. Emphasis on a review of the terms of reference and the closure criteria report. <p>General discussion on the structure of closure criteria.</p>	<ul style="list-style-type: none"> Discussed inclusion of Parks NT in CCWG meetings and the structure of closure criteria discussed. 	<p>Parks invited to attend meetings. Attendance began in March 2013.</p> <p>Review and provide feedback on the “Rehabilitation and Closure Objectives” section of the CC report in order to reach agreement at next meeting.</p> <p>Inform the ISWWG of the CCWG need to determine the most appropriate location for post closure monitoring</p> <p>ERA to meet with Parks (Anna Morgan) to provide context on the CCWG and discuss their attendance at future meetings and general involvement in the development of closure criteria.</p> <p>Add a new section to the Closure Criteria report that outlines the specific areas of concern for closure.</p> <p>Provide the updated “Post Closure land use” section to the CCWG at the next meeting.</p> <p>Expand Section 7.1 (Objectives for closure) to include the ERs word for word and then put ERA’s interpreted objectives underneath the relevant heading.</p> <p>Review and provide feedback on the updated objectives to reach agreement.</p> <p>Put together a closure criteria priorities table and include at an appropriate location within the document.</p> <p>ERA to liaise with CH about the timeline for producing a document for comment on the development of billabong water criteria.</p> <p>Cross channel Magela Creek channel analysis being done by Kate Turner to be presented at the next meeting.</p>
20/07/12	MTC	MTC members	<ul style="list-style-type: none"> Report from Mine Closure working group presented. 	None minuted	None minuted