



ERA Energy Resources of Australia Ltd

APPENDIX A: Stakeholder feedback

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A.1 2018 MCP feedback from SSB requiring further comment

Comment #	2018 SSB Assessment report Section	SSB comment in 2018 assessment report	ERA response in 2019 MCP	SSB response in 2019 assessment report	ERA response	2020 MCP Section
1	3.1 Risk assessment	<p>To justify the assignment and ranking of risks, risk classes, controls and control effectiveness, the risk assessment should include:</p> <ul style="list-style-type: none"> evidence to justify the likelihood and consequence rankings, including key assumptions and the level of certainty associated with the information informing this evaluation a clear distinction between existing and proposed controls, and evidence to support control effectiveness rankings including consideration of control applicability or availability during the three closure phases (i.e. decommissioning, stabilisation and monitoring and post-closure) a clear plan to obtain additional information to inform the assessment of each risk, to improve the control effectiveness, or to identify new risks as further information is obtained, where required. 	<p>The 2019 MCP includes further information to justify the assignment and ranking of risks, risk classes and controls. It is acknowledged that further development and refinement will be achieved in the 2020 risk assessment update, and these continual improvements will be included within each MCP update.</p>	<p><i>Acknowledged</i> Noted that the 2019 MCP does not appear to include further information to justify assignment and ranking of risks, classes and controls.</p>	<p>The 2020 MCP has included more details on the closure risks. This is now in Section 7. The risk register provided in Appendix 7.1 has been updated to provide additional clarity.</p>	7
2	3.1 Risk assessment	Terms and definitions should be simplified and standardised	[SSB - No response]	<i>Not addressed</i>	Terms and definition have been added at the beginning of the Section 7	7
3	3.1 Risk assessment	The likelihood classifications may need to be reconsidered given the long timeframe for the life of the project (10,000 years).	[SSB - No response]	<i>Acknowledged</i> Timeframes have been added to the likelihood classifications, although it is not clear how these were considered in the risk assessment scoring.	It is noted that some risks have the 10,000 year timeframe. The likelihood rankings used by ERA do not span this timeframe; however, it is the consequence of the risk occurring any time within the 10,000 years that is assessed. Based on this the likelihood descriptors are considered appropriate.	7
4	3.1 Risk assessment	<p>Additional discussion around control effectiveness and contingencies should be provided for existing controls that:</p> <ul style="list-style-type: none"> might be removed during decommissioning are known to be ineffective at the time of reporting. 	[SSB - No response]	<i>Not addressed</i>	<p>See response to comment 1 above. Additional information on contingencies for each of the closure execution activities is provided in Section 9.</p>	9
5	3.1 Risk assessment	<p>Table 9-6 should include:</p> <ul style="list-style-type: none"> reference to the existing controls the phase of closure for which the risk is being assessed 	[SSB - No response]	<i>Not addressed</i> Table 10-5 includes reference to controls noting that there is no distinction between	The risk assessment section in the MCP has been updated to distinguish between controls and actions. Actions, when implemented and realised becomes controls.	7



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		<ul style="list-style-type: none"> risk TC4-03: Delays to rehabilitation and/or closure activities extending beyond 2026 in the Aquatic Ecosystem risk category (TA), as well as the People risk category (TC). 		existing/potential controls, or the relevant closure phase.		
6	5.10 Landform. Detailed activity description	Provide additional information, including: <ul style="list-style-type: none"> detailed construction plans and timelines engineering designs, construction tolerances and a digital elevation model material movement and balances (including reference to consolidation models) assumed availability rates/capacities of key equipment mapped locations of material grades quality control procedures to be employed during construction a schedule showing material movements as the landform is constructed. 	This additional information will be provided within the MTC application (final landform and revegetation) due for submission in 2022.	<i>Acknowledged</i> In addition to the previously-listed information, the following should also be provided: <ul style="list-style-type: none"> plans/designs for the distribution/extent of the different surface materials (waste rock, rock armour, ripping, natural surfaces) on the final landform engineering designs and long-term management plans for proposed sediment and erosion control structures on the final landform up to date flood modelling 	Section 11 of the 2019 MCP and the associated appendices provided all of the feasibility study engineering drawings for the final landform, ripping, erosion controls and the latest flood modelling ready for execution. It is not clear what additional information is required.	9
7	5.10 Landform: Landform Stability	Provide the following information on the proposed flow and sediment control structures, including: <ul style="list-style-type: none"> the design a program of maintenance the volume of bedload requiring disposal potential impacts and planned mitigation measures that the structures are ineffective 	Design features are provided in Section 11. The maintenance is included within Section 12 - Monitoring and maintenance.	<i>Acknowledged</i> Most information has been provided, except volumes of sediment requiring disposal.	It is not possible to determine the volumes of sediment that will require removal from the sediment traps each year as this will be highly dependent upon the final rock placed on the surface and the rainfall for that year. As such ERA's maintenance program will be adapted each year as required.	9
8	5.10 Landform: Landform Stability	Provide information on the background bedload yields, to assess the potential impacts associated with bedload transport to Magela and Gulungul creeks (should this occur).	This KKN is planned to be completed in 2020, and the results will be incorporated into the next MCP update, and will supply the details requested in the comment.	<i>Acknowledged</i> Note that the primary relevant KKN is LAN1B.	KKN LAN1B is now a SSB KKN. SSB have allocated new projects to address the knowledge need (RES-2019-022).	N/A
9	5.10 Landform: Landform Stability	Assess the potential risks of extreme events and landscape-scale processes on landform stability.	These risks were considered under Category B, C & D of the August 2019 Risk Assessment. This also included consideration of greater than expected rainfall events, variation of predicted Pit 1 & 3 consolidation, excessive erosion impacting landform stability and the potential effects of large scale fire or cyclone events.	<i>Acknowledged</i> This will be addressed with completion of relevant ERA/SSB projects allocated to KKN LAN2.	No further action required	N/A
10	5.10 Landform: Landform Stability	Use synthetic rainfall datasets in flood modelling.	The LEM (landform evolution model) does utilise a synthetic rainfall data set for 10,000	<i>Not addressed</i>	The flood modelling completed for ERA assesses the early year sediment and erosion controls and does not require the	5



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			years, and also considers climate change scenarios.	The comment was in relation to use of synthetic rainfall data in flood modelling, not LEM modelling.	long term data set. The LEM modelling requires the synthetic long term data set. ERA is currently evaluating the final landform and completing sensitivity testing of key LEM model parameters including climate sequences, rainfall losses, particle size distribution and vegetation cover. In these evaluations, the synthetic rainfall data set of the SSB has been used. See also comment 35.	
12	5.10 Landform: Infrastructure Disposal	Section 7.5.1 states that all material with the potential for environmental impact will be placed at the bottom of the mined-out pits. It is suggested this statement is removed from the plan as it is not readily achievable given grade 1 waste rock has the potential for environmental impact.	[SSB - No response]	<i>Not addressed</i> It is noted that this comment was in the text but not specifically included in the relevant summary table of comments/recommendations in SSB's 2018 Assessment Report.	The statement was removed from this Section. Waste and hazardous material management are now discussed in Section 9.4.2	9
13	6.8 Water and Sediment: Water Management	A schedule should also be included for water treatment, indicating the planned options for process water treatment and demonstrating that these options will be sufficient to treat the predicted process water volumes.	A schedule for water treatment has been included. Three active process water treatment routes are planned: <ul style="list-style-type: none"> Treatment using the existing Brine Concentrator. The Brine Concentrator will be the principal path for active process water treatment, with its feed water stream drawn from the bulk process water inventory – which is typically the highest. A feasibility study is underway to incrementally expand the distillate production capacity of the Brine Concentrator through an upgrade of the vapour recompression fan in unit three. Under the median forecast, the Brine Concentrator will be decommissioned in June 2025 – after all sources of process water have ceased. Treatment using the HDS plant. This plant will treat an intermediate range of process water in terms of salt concentration, to minimise treatment cost and maximise plant throughput. HDS plant operation is planned from 2019 through to the end of 2021. Treatment using reverse osmosis technology, of similar nature to (and perhaps using) the Brine Squeezer. This treatment process will target sources of process water with lower salt concentration, and is expected to run through to the middle of 2025. The contributions of the three active process water treatment routes are shown in Figure 11-29. 	Acknowledged. Given the uncertainty associated with the predicted process water volumes up to 2025, it is critical that ERA is able to fulfil its identified contingency to continue water treatment and disposal of all process water (including expressed tailings pore water) for as long as necessary. As the process water treatment predictions are further refined, this may also have implications for the disposal of brine in Pit 3. Additional information should be provided in the RMCP, including: <ul style="list-style-type: none"> results of investigations undertaken in order to reinstate the Pit 3 underdrain extraction bore evidence to demonstrate the longevity of the brine injection wells and factors that may affect this. 	ERA has acknowledged for some time that there are scenarios in which water treatment may need to be extended, such as if significantly above average rainfall occurs in one of the later wet seasons within the rehabilitation period before catchment areas are sufficiently progressed through planned transitions to pond and ultimately release water designations. ERA will maintain such water treatment infrastructure as is necessary to complete water treatment and the disposal of waste streams. It should be noted that whilst the cumulative volume of water to be treated will depend on many factors, predominantly rainfall, the inventory of contained salt is much less variable and thus there is a high degree of confidence in the capacity of the Pit 3 underfill void space for brine disposal. In regard to the underdrain bore, the bore casing and annulus was surveyed 3 times by full-wave sonic cement bond logging to identify potential failures in the cement bond in the annular cavity. The casing was perforated at a specific point and pressure-injected ~2,200litres of grout to seal the annulus. This was again wireline surveyed to confirm the cement bond. A low-mobility grout was placed below the intersecting lateral to seal that zone. This work is completed to minimise the potential for groundwater infiltrating the	9



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					<p>borehole and will be validated during commissioning and performance testing. As a further contingency plan, a new design has been sourced for a vertical decant well.</p> <p>In regard to the brine injection wells, early operation was significantly impacted by the on/off nature of the brine concentrator operation due to a range of factors. This intermittent operation contributed to blockages within the brine injection wells through scaling / and crystallisation of salts out of the highly concentrated brine. This was known at the time of the Closure Feasibility Study and as such provision was made for the construction of additional brine injection wells. Engineering and design activities for these additional wells is occurring through 2020. Since 2017 the performance of the brine concentrator has improved significantly such that unplanned outages have been effectively eliminated. The risk to the integrity of brine injection wells is consequently also significantly reduced. Ultimately the longevity of individual wells, whilst impacting costs, is not a risk to closure schedule or environmental outcomes, as additional wells can be constructed as required.</p> <p>In addition to the option for additional wells as required, ERA is investigating the use of higher injection pressures and different maintenance options and contingency options for two brine injection failure scenarios. This is summarised in Section 9.3.2.4. However, as these investigations are continuing, detail cannot be provided in the 2020 MCP.</p>	
14	6.8 Water and Sediment: Water Management	Clarify why tailings pore water expression during deposition has increased by more than 30% in consolidation modelling results between 2014 and 2016.	Further explanation has been included within Section 7.1.3.	Not addressed In 7.1.3 it is stated that: 'The increase in expressed water (for the 2016 case) during deposition is due to thickening after Year 1 in the 2014 case.' However, the latest 2018 modelling shows that expression is now more consistent with the 2014 case (rather than 2016), which assumed thickened tailings.	The 2014 modelling considered tailings thickening which allows more water to be freed from the tailings at the process plant and recycled into the process circuit. As a result, the ex-mill tailings have less water available for expression during deposition into the Pit. The 2016 modelling on the other hand did not consider tailings thickening. Consequently, the ex-mill tailings have more water available for expression during deposition, into the Pit, than the case of the thickened tailings. At the end of deposition, the thickened	5



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					tailings achieved a dry density of 1.42t/m ³ while a dry density of 1.39t/m ³ was attained by the non-thickened tailings.	
15	6.8 Water and Sediment: Site Conceptual Models	<p>The RMCP should detail future hydrogeological work that will be undertaken to refine the Ranger Conceptual Model, and explain how this will further inform rehabilitation planning, particularly with regard to:</p> <ul style="list-style-type: none"> • further refinement and characterisation of key hydrogeological units, aquifers and groundwater flows in high-risk areas for contaminant transport (around Pit 1, Pit 3 and the Tailings Storage Facility) • further information on surface water/groundwater interactions <p>improved characterisation of existing contaminated groundwater (e.g. under the Tailings Storage Facility) and contaminated sites (e.g. Land Application Areas).</p>	<p>Work has been undertaken by ERA and INTERA in the last 12 months to update the Ranger Conceptual Model. Groundwater monitoring, specifically to support closure criteria, is detailed within Section 12.5.2. This monitoring has been designed to support further refinement of key hydrogeological units, and groundwater / surface water interaction via collection of groundwater quality and high resolution water level data via dataloggers. All monitoring data collected for both operational requirements and specific studies is used to support ongoing updates to the Ranger Conceptual Model. The updated Ranger Conceptual Model (INTERA 2019) details all refinements made to the characterisation of all hydrogeological units within the model domain, which includes all high risk areas. Project planning and scoping is underway to support future studies specifically to quantify the contamination below the Tailings Storage Facility and Processing Area. These studies will support the development of the remediation plan. The Tailings Storage Facility contaminated materials application will specifically address contamination as a result of operation of the Tailings Storage Facility. KKN WS2 and WS3 are to address surface water and groundwater interactions.</p>	<p>Acknowledged</p> <p>The conceptual model will need to be updated as this information becomes available and the RMCP should detail future hydrogeological work that will be undertaken to refine the model and explain how this will feed into the contaminant transport modelling and rehabilitation planning. Additional comments are provided in the 2019 RMCP Assessment Report.</p>	<p>Acknowledged.</p> <p>Details on studies to support and inform updates to the Ranger Conceptual Model have been included in the 2020 MCP, Section 5.</p>	5
16	6.8 Water and Sediment: Contaminant Source Terms	<p>Further work is required to quantify contaminant source terms and factors that influence their mobilisation on a whole-of-site basis, including existing groundwater contamination and contaminants predicted to arise from the waste rock landform, the buried tailings and contaminated soils and sediments disturbed during rehabilitation.</p>	<p>ERA has numerous projects underway to address this. Refer to the summary of activities against KKN WS1A What contaminants (including nutrients) are present on the rehabilitated site (e.g. contaminated soils, sediments and groundwater; tailings and waste rock)?</p>	<p><i>Acknowledged</i></p> <p>Additional information should be presented in the Pit 3 Closure application to demonstrate that all contaminant sources onsite, including contaminated groundwater and material associated with the Tailings Storage Facility and processing area, has been well characterised, is adequately represented in contaminant transport modelling and will not result in environmental impacts.</p>	<p>An update to the Ranger source term model has been undertaken during 2020 in order to inform the solute transport model and uncertainty analysis. The work completed to June 2020 has been included in the 2020 MCP (Section 5) and the completed works will be included in the Pit 3 closure application.</p>	5
17	6.8 Water and Sediment: Contaminant Transport Modelling	<p>A robust analysis of model uncertainty will need to be undertaken to quantify and understand the level of uncertainty associated with the modelled outputs.</p>	<p>The Ranger Mine sitewide modelling process complies with the guiding principles from the Australian Groundwater Modelling Guidelines. The Ranger Mine groundwater calibrated model will meet all indicators for</p>	<p><i>Acknowledged</i></p> <p>It is noted that uncertainty analysis will also need to be undertaken for the surface water model.</p>	<p>The preliminary surface water model as described in Section 5 provides probabilistic predictions of concentrations of COPCs in surface waters downstream of the mine site.</p>	5



ERA

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			the Level 3 confidence level (highest confidence level) after completion of the planned peer review by an independent hydrogeologist with modelling experience. Furthermore, ERA have made a commitment to have INTERA update minor Sections of the report to address comments made by SSB. The outstanding concerns relate to development of a formal uncertainty analysis which ERA has committed to undertake (and will be included in future MCP when complete).		The surface water modelling update will assess a range of solute transport loading predictions identified through the uncertainty analysis completed as part of the groundwater solute transport modelling by INTERA. Key parameters within the surface water model will also be examined and tested to assess model prediction sensitivity as part of the surface water modelling update. The completed surface water modelling update will be included in the Pit 3 closure application.	
18	6.8 Water and Sediment: Closure Criteria	Define the process for ALARA in the context of closure criteria and provide examples of water and sediment criteria that are ALARA.	The MCP has been updated to clarify use of ALARA, as a process, in respect to closure criteria. ANZG (2018) supports the use of narrative statements for guideline values and water quality objectives. Several examples of narrative draft water quality objectives are used in Table 6-3, eg demonstrating what water quality is ALARA, and for aesthetic water values.	<i>Acknowledged</i> It is noted that there don't appear to be any examples, or a Table 6-3.	The closure criteria chapter changed from chapter 6 in the 2018 MCP to chapter 8 in the 2019 MCP. The table reference should have been to Table 8.2 where there are examples of narrative criteria. The stakeholder Water and Sediment Working Group has been discussing how ALARA can be assessed using the BPT and risk management frameworks. ERA have finalised a report on this and the information included in the 2020 MCP as Appendix 6.2.	
19	6.8 Water and Sediment: Closure Criteria	Assess the potential for offsite impacts associated with mobilisation and accumulation of contaminants via transport of suspended sediments.	Sediment transport and accumulation will be predicted by the surface water model. ERA has several projects assessing the risk associated with sediment contamination. Refer to projects listed against KKN WS5A. Will contaminants in sediments result in biological impacts, including the effects of acid sulfate sediments?	<i>Acknowledged</i> Noted that the current surface water modelling being undertaken by ERA may not predict concentrations of suspended sediments.	The surface water model (OPSIM) will provide suspended sediment concentrations at defined nodes (receptors). Sediment accumulation will not be modelled, on the basis that the majority of sediment generated from runoff is in the early phase of closure, where erosion and sediment controls will ensure sediment is largely managed and retained on the premises. The results of Landform Evolution Modelling completed by SSB suggest denudation rates off the final landform will be on a trajectory towards background and, as such, accumulation of sediments will be consistent with natural/background conditions. The surface water model predicts suspended sediment concentrations but not accumulation. CAESAR modelling undertaken by the SSB predicts sediment movement from the mine but not accumulation. ARRTC and stakeholder working groups discussed issues with modelling sediment	8



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					<p>accumulation and the associated risks and agreed</p> <p>(i) modelling of sediment accumulation is not required,</p> <p>(ii) turbidity criteria address the risk associated with suspended sediment, and</p> <p>(iii) the risk from bedload sediment will be managed by erosion control and monitoring plans.</p>	
20	6.8 Water and Sediment: Monitoring	<p>The surface water monitoring program should include:</p> <ul style="list-style-type: none"> acknowledgment that additional contaminants that have not been previously identified as a risk may need to be considered in future (e.g. findings from contaminated site investigations) and include provision in the post-closure monitoring program for periodic review of contaminants key sites on the Ranger Project Area (e.g. Georgetown Billabong, Coonjimba Billabong, RP1 and other onsite waterbodies, while they are present) for demonstration that concentrations of contaminants are as low as reasonably achievable acknowledgment that grab sampling may need to be conducted more frequently than monthly in the initial period after completion of rehabilitation works sampling for Ra-226. 	<p>These sites are included in the revised monitoring program and the potential use of event triggered monitoring is discussed in addition to monthly grab sampling. The CoPC list is currently being reviewed and a project to review again following contaminated sites sampling is scheduled. Project 1221-07 <i>Acid Sulfate Sediments Conceptual Model</i> is underway to address this. Previous studies have also addressed this.</p>	<p><i>Acknowledged</i></p> <p>The monitoring program should be refined and agreed between ERA and the Supervising Scientist via the Water and Sediment Quality Working Group.</p>	<p>Noted. All monitoring commitments will be updated and reviewed via the Water and Sediment Working Group (WASWG) or MERRG as the Ranger Mine transitions to closure. The WASWG has recognised this as one of their objectives.</p>	10
21	7.8 Radiation Rehabilitation monitoring	<p>Include groundwater radionuclide monitoring within the radiation monitoring program.</p>	<p>Post-closure monitoring of radionuclides in groundwater is now included in Table 12-9. Radionuclides are also included in Table 12-7 of the groundwater monitoring program discussed in Section 12.</p> <p>Monitoring during the closure and post-closure phases will continue to be refined as relevant studies are completed. Changes and additional detail regarding groundwater radionuclide monitoring will be incorporated into future iterations of the MCP and the Annual Ranger Water Management Plan.</p>	<p><i>Not addressed</i></p> <p>Post-closure monitoring of radionuclides in groundwater is not included in Table 12-9. Also noted that radionuclides specified in Table 12-7 are background data, not proposed monitoring.</p>	<p>All monitoring commitments, in the transition to closure, will be updated and reviewed via the WASWG or MERRG.</p> <p>The most updated agreed monitoring program has been included in the 2020 MCP Section 10 and includes Ra-226 analysis in Groundwater.</p>	10
22	8.6 Soils Closure Criteria	<p>Assess the risk of contaminated soils within the Ranger Project Area impacting the environment outside the Ranger Project Area.</p>	<p>A risk review was held as part of the Feasibility study to identify further work required to scope and assess potentially contaminated sites to the correct level to satisfy the closure objectives and relevant</p>	<p><i>Not addressed</i></p> <p>It is not clear how the contaminated sites assessment will inform off-site risks, or demonstrate that on-site risks are ALARA.</p>	<p>Noted. Appendix 12.2 of the 2019 MCP details the proposed process for contaminated sites assessment, including data quality objectives. Results from the 2019 contaminated sites drilling program</p>	5



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			legislation. The Contaminated Site Register was updated throughout 2018 and has been reviewed to identify contamination volume, clean up requirements, and the potential impact of the contamination outside of the Ranger Project Area. (Refer to Section 7.10.9)	Information on contamination volumes, clean up requirements and potential off-site impacts should be included in the RMCP – the Section referenced in ERA’s response does not exist in the document.	will be interpreted with informed relevant guideline levels to better understand the risk associated with each contaminated site. This will inform the BPT assessment to select an appropriate management option. The ALARA framework in Section 6 will assist in informing the BPT assessment. Details on the contaminated sites assessment completed in the past 12 months are provided in the 2020 MCP (Refer to Section 5). As assessments are completed they will continue to be provided in the annual MCP updates.	
23	9.7 Ecosystem Restoration: Detailed Activity Description	Expand the Revegetation Strategy to an ecosystem restoration strategy.	The rehabilitation of the RPA will consider ecosystem establishment, and not simply the revegetation of the site. An ecosystem rehabilitation strategy will be developed, incorporating relevant KKN information, when complete, and be included within future MCP updates.	<i>Not addressed</i>	Draft fauna closure criteria have been developed for the 2020 MCP. Following review and incorporation of comments from stakeholders this will form the basis of a faunal recolonisation strategy. Once complete the Revegetation Strategy can be updated to an ‘Ecosystem Rehabilitation Strategy’.	8
24	9.7 Ecosystem Restoration: Ecosystem Restoration	Provide uncertainty analysis for all modelling undertaken in relation to demonstrating that there will be sufficient plant available water in the final landform.	Information on PSD and PAW modelling, plant rooting depth, subsurface consolidated layer, and more has been added to the 2019 MCP. Consistent with information previously provided as part of 2019 App. 3 to Pit 1 Application. Supporting information available within the reference Lu P, Meek I, Skinner R. 2019. Supporting Information on Revegetation Growth Substrates at Ranger for Pit 1 Application. Energy Resources of Australia Ltd report, Feb. 2019	<i>Not addressed</i> No additional uncertainty analysis has been provided in the 2019 RMCP.	The key uncertainty in the PAW risk assessment associates with the following factors: <ul style="list-style-type: none">• Fines % of the growth medium (ie. Potential water holding capacity);• Growth media thickness (assuming it is also accessible by root system);• Type of vegetation supported by the growth media; and• Weather conditions. To make it more explicit, the 2020 MCP PAW studies has been updated and revised, including a sub-section to describe the uncertainty analysis (Appendix 5.1).	5
25	9.7 Ecosystem Restoration: Ecosystem Restoration	Provide evidence to demonstrate that compaction layers: <ul style="list-style-type: none">• will improve the water-holding capacity of the waste rock• will not lead to other issues affecting plant growth (e.g. physical restriction of roots, formation of perched water tables)	The results of the completed KKN are summarised within Section 7.3.5 of the updated MCP. Demonstrated that 4-6 m of waste rock landform with various levels of rock contents can maintain a positive PAW water balance while supporting a vegetation similar to one of the reference sites.	<i>Acknowledged</i> Any reference to compaction layers appears to have been removed from the 2019 RMCP, with no explanation provided for this.	ERA has clarified that there is no purposely compacted layer proposed and, following subsequent stakeholder discussions, it was agreed that the term ‘compaction’ would be avoided in order misinterpretation. The term ‘consolidated layer’ replaces ‘compaction’.	
26	9.7 Ecosystem Restoration:	The lack of a seasonal trend in radon exhalation rates on the waste rock-only Section of the trial landform should be	<i>Bollhöfer, A., Doering, C., 2016. Long-term temporal variability of the radon-222 exhalation flux from a landform covered by</i>	<i>Not addressed</i>	Volumetric soil moisture content in the Trial Landform substrate is described in	5



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	Ecosystem Restoration	investigated in the context of the ability of the waste rock substrate to retain water.	<i>low uranium grade waste rock. J. Environ. Radioact. 151, 593–600.</i> has discussed the effect of the soil moisture on the radon emission.	The cited reference reports on seasonal trends in radon exhalation flux from waste rock. However, ERA has not integrated this information (in particular that seasonal variations in radon exhalation from waste rock begin to occur 2+ years after landform construction) into Section 7.3.3 of the MCP.	Appendix 5.1 (which includes the seasonal variation) is the same data in the published paper by <i>Bollhöfer, A., Doering, C., 2016</i> ERA has not used direct measurement data for soil moisture and not the relationship of seasonal trends in Rn-222 exhalation flux and soil moisture to date.	
27	9.7 Ecosystem Restoration: Ecosystem Restoration Risks Not Assessed	Provide information to assess how vegetation community development may be affected by landform stability, including re-contouring the landform surface.	Landform stability is considered in the final landform design, and follow up monitoring. Refer to updated MCP relevant Sections (7.5). The predicted date for completion of KKN LAN3 - will be the end of 2020, and thus results will be discussed in the 2021 updated MCP.	<i>Acknowledged</i> Noted that it is not clear if the results discussed in Section 7.5 of the RMCP from the analysis of the FLV5.2 landform are the same as those from the FLV6.2 landform.	During the monitoring and maintenance phase, the landform may settle over time and there is also the potential for subsidence and/or erosion to occur. Revegetation must also progress towards a self-sustaining ecosystem. Potential remedial management practices to ensure continued progress towards a stable landscape and self-sustaining ecosystem in this phase are described in Section 10	10
28	9.7 Ecosystem Restoration: Closure Criteria	Clearly justify why some closure criteria would be more important than others, in relation to the Environmental Requirements.	Some criteria, such as canopy architecture and ground cover index, are not independent of each other and should be considered collectively, or within the context of meeting the overall closure objective as a whole. This approach was recommended by DPIR as part of their initial assessment of the Ranger Mine closure criteria and ERA agrees with this recommendation.	<i>Acknowledged</i> SSB will seek clarification from ERA on this response.	It is acknowledged that the wording provided in the 2018 MCP was not clear. During 2020 the descriptive closure criteria for flora and fauna have been finalised. The closure criteria sections have been updated and this wording was removed. See Section 8.	8
29	9.7 Ecosystem Restoration: Closure Criteria	Ensure that the closure criteria for ecosystem restoration use consistent and clearly defined terminology.	Updating the content within the Closure Criteria and Supporting Studies Sections has addressed these inconsistencies.	<i>Acknowledged</i> SSB will seek clarification from ERA on this response.	Refer above response to comment 28.	8
30	9.7 Ecosystem Restoration: Closure Criteria	Provide information to justify the proposed plant reproduction closure criterion of evidence of flowering and fruiting in 80% of species, including consideration of the amount and periodicity of flower, fruit and seed resources provided in the revegetated site.	Information to justify this criteria is pending further studies and finalisation of the reference sites. This will be updated when suitable information is available. At present, woody species are being assessed and of these evidence has demonstrated that only a single species has not reproduced on site trials.	<i>Acknowledged</i> Criteria will need to take into account that there is a key difference between flowering/fruited and successful reproduction (i.e. new individuals established and surviving).	Refer above response to comment 28.	8
31	9.7 Ecosystem Restoration: Closure Criteria	Criterion F13 should be reworded to; feral animal densities 'not greater than' those in surrounding areas, as opposed to similar to those in surrounding areas.	This criterion has been reworded in terms of weeds and feral animals to "not greater than" the surrounding areas. Note - Previous wording was used to align with the KKN. Work on fauna return strategies (including criteria / monitoring approaches) is ongoing and updates may be expected in 2020 MCP.	Not addressed Criterion F13 in Table 8-5 of the RMCP has not been reworded as per the ERA response.	This was an editing error and has been corrected in the 2020 MCP	8



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
32	Section 7.5 Landform design and performance	This Section includes information on model development being undertaken by the Supervising Scientist that is either out of date or incorrect. For example, the Supervising Scientist is not integrating a dynamic vegetation model linking soil moisture to biomass growth.	Ensure that information on landform modelling being undertaken by the Supervising Scientist is correct and up to date.	Noted. Section 5 has been updated with up to date information.	5
33	Section 7.5 Landform design and performance	There is insufficient information on planning/ monitoring of material movements and proposed surface structures.	Provide more detailed information to demonstrate adequate planning and monitoring of material movements, including a basis on which the progress of landform construction can be assessed over time.	A mine plan has been developed for material movement over the closure period. This model uses a full suite of parameters as is standard in the mining industry to plan material movement by a truck and shovel fleet and includes parameters such as truck and shovel hours, Fleet Availability and Effective Utilisations plus a suite of standard mine planning parameters. The output of this mine plan is a detailed execution plan for material movement from the various stockpiles on site to their ultimate destination across site. This plan is updated at least every year. Material movement is tracked on a shift by shift basis against plan by the mine team against plan. There is also a weekly material movement tracking metric that is discussed at the Manager/GM level against the weekly plan. Refer to Section 9 in the MCP.	9
34			Provide more detailed information to justify the proposed surface structures, including up to date flood modelling, engineering designs and long-term management plans.	Provided in Section 9 of the MCP	9
35	Section 7.5.2 Landform flood study	The landform flood study does not take into consideration the impacts of major flood events on long-term landform stability and could be improved by incorporating the synthetic rainfall datasets that have been supplied to ERA by the Supervising Scientist.	Consider the impacts of major flood events on long-term landform stability and incorporate the synthetic rainfall datasets in landform flood modelling.	The landform flood studies are completed in order to appropriately design the short term erosion and sediment controls structures. These structures are required to manage the higher sediment loads expected in the first few years post landform construction. It is expected that many of these structures will not be required after the first 10 years. Once they are no longer required plans for either their infilling or removal will be agreed with stakeholders. The landform flood studies, being a short term focus, do not require the use of a synthetic rainfall data set. The assessment of long term landform stability can only be completed with a landform evolution model (e.g. CAESER or SIBARIA). Landform evolution modelling has historically been completed by the Supervising Scientist and the results reported in the MCP. ERA, supported by RioTinto are completing sensitivity testing of key LEM model parameters including climate sequences, rainfall losses, particle size distribution and vegetation cover.	5
36	Section 8.2 Table 8-1 Closure criteria landform	Closure criteria related to the physical isolation of tailings for 10,000 years that were proposed in the 2018 RMCP (i.e. previously L3 and L4) have been removed in the 2019 RMCP, without justification.	Reinstate the closure criteria to demonstrate that tailings will be isolated for at least 10,000 years, or provide justification for their removal.	The 2019 Landform closure criteria were reviewed and updated by ERA to match the Supervising Scientist Standard for Landform. Updated Closure Criteria are described in Section 8.	8



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
37	Section 8.2, Table 8-1 (L4) Closure criteria	While the closure criterion related to denudation rate (L4) has been proposed in accordance with the Landform Rehabilitation Standard, it is noted that the clarifying text <i>averaged over the entire landform</i> that was proposed in the 2018 RMCP (i.e. previously L5) has been removed in the 2019 RMCP. The previous text allowed for some degree of variation across the landform.	Reconsider the requirements for denudation rate.	Noted. The Landform closure criteria submitted were reviewed and updated by ERA to match the Supervising Scientist Standard for Landform.	8
38	Section 11.4.1.6 Dredgers removal and disposal	<i>This will, in turn, mean that remnant tailings on the floor under beached equipment would not be able to be removed.</i> This is not in accordance with the environmental requirement ER11.2	Consult with stakeholders regarding the proposal for some remnant tailings, which is not in accordance with the environmental requirements.	ERA is currently completing work on the plan for cleaning of the floor and walls of the Tailings Dam at the completion of dredging, prior to its longer term use as a process water storage facility. This plan will form the basis of how ERA will demonstrate to stakeholders how it intends to comply with ER11.2. The outcomes of this will be included in the 2021 MCP.	9
39	Section 11.16.6 Erosion & sediment controls	Although denudation rates on the landform are unlikely to reach background denudation rates for at least 1000 years, under higher rainfall scenarios and on different areas of the final landform, it may take significantly longer for the denudation rate to reflect background rates (i.e. >10,000 years).	Acknowledge the uncertainty in the erosion modelling and ensure that plausible worst-case scenarios are considered in the design of the final landform and surface erosion control structures.	Noted. The synthetic rainfall data set already considers higher rainfall scenarios. Note that all existing/current LEM modelling is being undertaken by SSB. ERA is continuing to work on an optimised landform design to present for modelling of scenarios. ERA is currently working on a sensitivity analysis on some of the parameters used in the modelling completed as described in Section 5.	5
40	Section 12.4 Landform monitoring	The RMCP mentions the use of vibrating piezometers to monitor excess pore pressures within tailings but it is not clear whether or how they may be used to inform tailings consolidation in the final landform. It is understood from consultation with ERA that it may not be possible to utilise the settlement plate method (i.e. as used in Pit 1) in Pit 3.	Provide further information on tailings consolidation monitoring, including Pit 3 and during the post-closure phase.	The Pit 3 tailings monitoring instruments will provided information on tailings pore pressure and hence settlement. The measured data for tailings settlement versus time will be utilised to track the predicted data obtained from the consolidation model. The settlement and corresponding time for a given degree of consolidation (for example 95%) can be determined. The appropriate type of monitoring instruments based on the tailings in Pit 3 will be provided as part of the Pit 3 closure application and summarised in the 2021 MCP.	10
41	Section 11.16.6.1 Appendix 11.4 Revegetation strategy	<i>...ripping to 0.5 m deep along the contour at four metre intervals, creating rough contour banks which will slow runoff and encourage infiltration in areas of identified higher erosion potential...</i> Further consultation with Traditional Owners and assessment of ripping benefits versus impacts will be undertaken prior to finalising the ripping design for the remainder of the landform. The ripping design in the feasibility study was to minimise erosion only... Surface ripping has been identified as critical to early erosion control and subsequent vegetation establishment and soil development (Saynor <i>et al.</i> 2019). Rip lines of 0.5 m depth will be installed at 4 m intervals across the entire surface of the waste rock landform. It is unclear how the areas of higher erosion potential have been identified and on what basis have been used to determine areas that require ripping.	Present a consistent and justified approach to surface ripping of the final landform that considers requirements for erosion control, infiltration (i.e. ecosystem establishment vs contaminant transport) and the views of Traditional Owners.	In order to assess the various aspects affected by ripping and obtain input from all stakeholders, ERA has planned a ripping trial for the Pit 1 final landform. Details of this trial have been provided in Section 9 and discussions with stakeholders are ongoing.	9



ERA

A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
42	Section 12.6.2 Table 12-9 Radiation closure and post-closure monitoring	In addition to Ra-226, studies by SSB suggest that Po-210 and Pb-210 are important dose-forming radionuclides in terrestrial bushfoods.	Consider including Po-210 and Pb-210 in the post-closure monitoring of radionuclides in terrestrial bushfoods.	Noted and included.	10
43		The gamma spectrometry method specified is unlikely to have the requisite sensitivity for measuring radionuclides in terrestrial bushfoods.	Consider alpha spectrometry as the analysis method for Ra-226, Po-210 and Pb-210 (via Po-210 ingrowth) and ICP-MS as the analysis method for U.	Noted and included.	10
44		Information currently provided in Table 12-9 suggests that the only terrestrial bushfood group to be monitored for radionuclides is fruit. There are several other terrestrial bushfood groups in the model diet (e.g. buffalo, pig, wallaby, goanna and yam) through which radionuclides can be ingested.	Provide a list of the terrestrial bushfood groups to be targeted for post-closure monitoring of radionuclides or if fruit is the only group to be targeted, then justification for this needs to be provided.	ERA will be undertaking a terrestrial and aquatic bushfood sampling program which is described in Section 5. ERA's permits and approvals for collection of bushfoods expire in 2025 and therefore terrestrial bushfood will be collected prior to expiry.	5
45		Table 12-9 indicates that there will be no post-closure monitoring of radionuclides in aquatic bushfoods (i.e. only water).	Consider the inclusion of monitoring of radionuclides in aquatic bushfood, especially for on-site waterbodies potentially contaminated by mining operations (e.g. Georgetown Billabong), to confirm dose estimates based on water radionuclide measurements.	ERA will be undertaking a terrestrial and aquatic bushfood sampling program which is described in Section 5. ERA's permits and approvals for collection of bushfoods expire in 2025 and therefore terrestrial bushfood will be collected prior to expiry.	5
46		Po-210, in addition to Ra-226, is an important dose-forming radionuclide in aquatic bushfoods.	Consider including Po-210 in the post-closure monitoring of radionuclides in water for the purpose of estimating ingestion doses from aquatic bushfoods.	Noted. Po-210 is now included in the radiation closure and post-closure monitoring program provided in Section 10.	10
47		The gamma spectrometry method specified is unlikely to have the requisite sensitivity for measuring radionuclides in water.	Consider alpha spectrometry as the analysis method for Ra-226 and Po-210 in water and ICP-MS as the analysis method for U in water.	Noted. The monitoring program has been updated to remove the specific method for analysis of radionuclides in water. This can be determined closer to the 2026 and the best available method at the time used.	10
48		Section 7.3.3 Radon exhalation	<i>...there was no obvious seasonal trend observed for radon exhalation fluxes from waste rock only.</i> The most up-to-date information on radon exhalation characteristics for waste rock has not been referenced. A study by SSB indicates that seasonal variations in radon exhalation fluxes from waste rock begin about 2+ years after landform construction: Bollhöfer, A., Doering, C., 2016. Long-term temporal variability of the radon-222 exhalation flux from a landform covered by low uranium grade waste rock. J. Environ. Radioact. 151, 593–600.	Reference the most up-to-date studies and their findings for radon exhalation characteristics from waste rock.	Noted. ERA has updated the Trial landform knowledge base section (Section 5.3.5.1) with reference to the 2016 paper on radon exhalation by Bollhöfer and Doering.
49	Section 7.4.1.3 (including Table 7-16) Bushfood radiation baseline	The most up-to-date information on radionuclide activity concentrations and concentration ratios in bushfoods has not been referenced. The most up-to-date information is available in: Doering and Bollhöfer, 2016. A database of radionuclide and metal concentrations for the Alligator Rivers Region uranium province. Journal of Environmental radioactivity 162-163, 154-159. Doering et al., 2017. Estimating doses from Aboriginal bush foods post-remediation of a uranium mine. Journal of Environmental Radioactivity 172, 74-80.	Consider revising this Section with the most up-to-date information on radionuclides in bushfoods.	Reference to this new data has been provided in Section 5.2.9.3. This data will be used for any future radiation dose assessments undertaken	5
50	Section 2.2.9.7	The summary of the site water model is based on August 2018 results. Given that it is such an integral aspect of the	Present results of the most up to date site water model and assumptions and ensure the approval status of	The model presented in the 2019 RCMP was the model current at the time of preparation of that RCMP.	9



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
	Site water model Section 11.5.1 Water treatment closure activities	site closure planning, the most up to date results and assumptions should be presented in the RMCP (e.g. as an Appendix). The approval status of assumptions for future water treatment processes is unclear, as some strategies are yet to receive regulatory approval.	potential or proposed future water treatment processes is clearly stated.	The model described in the 2020 RCMP is the current approved model dated February 2020. Section 9 The approval status of future water treatment options have been included in the RCMP text. Section 9.4.3	
51		This modelling includes a number of significant assumptions, such as seasonal rainfall, water treatment capacity and efficiency over time and volume of contaminated water generated by the process of tailings consolidation in Pit 1 and Pit 3. However, there is no indication of model uncertainty based on the likely variability in these assumptions over time.	Provide information on surface water model uncertainty relating to variability in model assumptions over time, to enable a detailed assessment of likely success of the proposed water treatment strategies.	ERA assumes the word “surface” was mistakenly written instead of “site”. The site water model provides forecasts of possible outcomes given variation in rainfall, with that variation being based on historical rainfall observations. Closure planning is completed on a median or 50 th percentile basis, with contingencies identified to deal with higher rainfall scenarios. Any contingencies or strategy changes are all cost based and have no impact on the environmental outcome.	9
52	Section 7.1.2 Pit 1 Tailings consolidation	The solute balance indicates that the measured mass of solute recovered through the decant towers matches the mass of solute estimated to have been expressed from tailings (Figure 7-6). The volume balance indicates that the decant structures are recovering additional volume from the waste rock cap. Figure 7-6 actually shows the solute expression profiles are similar but in fact the predicted mass of solute is consistently underestimated by the model by up to 20% and is fairly consistent	Provide evidence or discussion to support the assumption this consistent difference is simply attributed to waste rock as a source term and not an inherent underestimation from the source term assessment or consolidation model outputs.	Note that in the 2019 MCP, Figure 7-6 shows cumulative solute (magnesium) flow. The variation between the two curves occurs mostly in the first five months, when only a single sample of decant water was available (see chevron markers on x axis). This five month period corresponds to the wet season, when rainfall inflows can significantly influence concentration and a single sample is unlikely to be representative of the average concentration over the time. After the initial four months the curves are mostly parallel – the instantaneous rate of solute flow (given by the slope of the curves) is similar. If there was a consistent difference, the curves would continue to diverge. See the reference (Harvey, 2019) in the text for more information.	9
53	Section 10.3 Closure risk assessment	<i>Process water treatment required beyond closure date to treat process water to achieve 95% consolidation for Pit 3.</i> No details have been provided to describe how consolidation of tailings in Pit 3 will be measured over time, nor how achievement of the 95% consolidation target will be verified.	Detail how consolidation of tailings in Pit 3 will be measured over time and how achievement of the 95% consolidation target will be verified.	The Pit 3 tailings monitoring instruments will provided information on tailings pore pressure and hence settlement. The measured data for tailings settlement versus time will be utilised to track the predicted data obtained from the consolidation model. The settlement and corresponding time for a given degree of consolidation (for example 95%) can be determined. The appropriate type of monitoring instruments based on the tailings in Pit 3 will be provided as part of the Pit 3 closure application and summarised in the 2021 MCP.	9
54	Section 7.4.3.6 Prediction of existing groundwater contamination	Further information is required to support the approach to remediating contaminated groundwater and soils across the site.	Provide more detailed information on the nature and extent of the existing contaminated groundwater and soil, demonstrating that the: level of contamination has been adequately measured (i.e. that samples are representative) volumes of contaminated material have been reliably estimated environmental risk associated with leaving the contaminated material in place has been assessed, and	Detailed contaminated sites investigations were completed in late 2019 and results are being analysed. Studies into contamination in soils and groundwater are captured within KKN WS1 with multiple studies currently underway. Updates on studies completed to date have been provided in Section 5.	5



ERA

A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
			where necessary, compared against the risk of remediation and disposal of the material in the upper levels Pit 3 during the late stages of waste rock backfill (which according to the current schedule is when much of the material will be placed in the pit)		
55	Section 7.9.9.1 Contaminated sites - plumes	<i>This lack of impact to nearby downgradient bores suggests that migration of contaminants from the processing plant area is extremely slow....</i> <i>...The contaminant plume that is present in the processing plant area has migrated to the south and south east, towards Corridor Creek, consistent with local groundwater flow directions.</i> <i>However, the lack of recent water quality data throughout much of the processing plant area leaves uncertainty about current groundwater conditions.</i> These statements appear to be inconsistent and there has been impact identified in downgradient bores, as identified through recent groundwater reports.	Remove inconsistencies in relation to groundwater contamination in the processing area and update to reflect what the latest groundwater monitoring has identified in terms of downgradient groundwater impacts.	Inconsistencies have been revised and updated. The work completed to June 2020 has been included in the 2020 MCP (Section 5.4.3) and the completed works will be included in the Pit 3 closure application.	5
56	Section 7.9.9 Contaminated sites	(Table 7-39) <i>Once tailings are removed, assumption that no remediation is required</i> (p 7-210) <i>Natural attenuation is assumed to allow for plume remediation</i> These statements appear to be out of date, when INTERA's current body of work is already assessing what to do with contaminated materials below the Tailings Storage Facility.	Ensure statements in relation to remediation of Tailings Storage Facility contaminated groundwater are consistent with current knowledge and planned work.	An assessment to inform material management strategy for the TSF sub floor material and the Pit 3 closure application was undertaken in late 2019. The key finding of the study was that removing the subfloor material from below the TSF and placing it in Pit 3 would result in higher solute loadings to the environment. Refer to Section 9.3.3.3.	9
57	Section 7.9.9.1 Contaminated sites - plumes	<i>Reclamation is expected to remove much of the CoPC sources in the shallow soil, so groundwater concentrations are expected to decrease over time</i> While it is agreed that source removal will eventually result in lower concentrations in groundwater, it is unclear over what period of time this might occur, or the fate and transport of the CoPC that remain in the soil and groundwater.	Provide further information to demonstrate how removal of soil contamination in the processing area will address groundwater long term contamination (i.e. predicted concentrations, timeframe, fate of residual soil/groundwater contamination).	Detailed contaminated sites field investigations were completed in late 2019 and results are being analysed. Studies into contamination in groundwater are captured within KKNWS1 with multiple studies currently underway. An update to the Ranger source term model has been undertaken during 2020 in order to inform the solute transport model and uncertainty analysis. The work completed to June 2020 has been included in the 2020 MCP (Section 5) and the completed works will be included in the Pit 3 closure application. Results from the 2019 contaminated sites drilling program will be interpreted against known knowledge gaps identified during the Feasibility Study. These results will then inform BPT assessments to select an appropriate management option, based on what impact is ALARA. Updates on studies completed to date have been provided in Section 5. As assessments are completed, they will continue to be provided in the annual MCP updates.	5
58	Section 11.9.1.2 Catchment management - LAAs	Although it is acknowledged in the RMCP that further assessment is required to demonstrate there are sufficient disposal options for treated pond water throughout rehabilitation, further consideration is needed of the future capacity of the remnant Land Application Areas, and	Provide further information on the future capacity of the remnant Land Application Areas, and whether or not there will be an increase in associated environmental risks (e.g. waterlogging, unseasonal runoff, and alteration to groundwater levels).	ERA will be completing OPSIM-based water balance studies to determine the ability to dispose of treated pond and process water, throughout closure and as Land Application Areas are removed from service and rehabilitated. This water balance will also assess the	9



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
		whether or not there will be an increase in associated environmental risks (e.g. waterlogging, unseasonal runoff, and alteration to groundwater levels).		balance between other disposal methods and demand from revegetation irrigation. This work is expected to be completed during 2021 and will be provided in an updated MCP.	
59	Section 11.9 Water management	During progressive rehabilitation and construction of the final landform, there may be an increase in suspended sediment concentration in surface runoff from the site, which may increase the risk of sediment-related impacts to the offsite environment.	Surface water modelling being conducted to predict the concentrations of suspended sediment in the creeks surrounding the Ranger Project Area should consider the deposition of sediment throughout surrounding catchments, particularly to assess the risk of infilling of nearby billabongs.	<p>During rehabilitation works and the construction of the final landform sediment will be actively managed according to the Ranger Water Management Plan.</p> <p>Post closure sediment and erosion control structures will be installed to actively manage sediment runoff. This negates the requirement of sedimentation modelling. Details of the design of these structure have been provided in Section 7.4.5.</p> <p>The surface water model predicts suspended sediment concentrations but not accumulation. CAESAR modelling done by SSB predicts sediment movement from the mine but not accumulation.</p> <p>ARRTC and stakeholder working groups discussed issues with modelling sediment accumulation and the associated risks and agreed (i) modelling of sediment accumulation is not required, (ii) turbidity criteria address the risk associated with suspended sediment, and (iii) the risk from bedload sediment will be managed by erosion control and monitoring plans.</p> <p>The surface water model (OPSIM) will provide suspended sediment concentrations at defined nodes (receptors).</p> <p>Sediment accumulation will not be modelled, on the basis that the majority of sediment generated from runoff is in the early phase of closure, where erosion and sediment controls will ensure sediment is largely managed and retained on the premises. The results of Landform Evolution Modelling completed by SSB suggest denudation rates off the final landform will be equivalent to or below background and as such accumulation of sediments will be consistent with natural/background conditions.</p>	9
60	Section 11.10 Waste and hazardous material management	The current works schedule states that the Tailings Storage Facility will be required for process water storage until late 2024, and that backfill of Pit 3 will be completed by 2025. This does not allow for the possible disposal of contaminated material from the Tailings Storage Facility in the lower levels of Pit 3, given that the pit backfill would be close to completion.	Backfill of Pit 3 should not commence until it has been demonstrated that the placement of material from the TSF into Pit 3 is not required.	A TSF contaminated material trade-off study has been completed, demonstrating better outcomes to leaving material <i>in situ</i> rather than placement in Pit 3. Refer to the TSF subfloor contaminated material management application (approved by stakeholder on 6 August 2020). A summary of this application has been provided in Section 9.3.3.3.	9
61		Insufficient information is provided on the disposal of contaminated soils, site infrastructure and other materials to enable assessment of the planned waste disposal.	Provide further information on the disposal of contaminated soils, site infrastructure and other materials, including the effect that in-pit disposal may have on tailings consolidation, and an assessment of the potential environmental risks and information on how they will be mitigated.	Detailed contaminated sites field investigations were completed in late 2019 and results are being analysed. A summary of work completed to June 2020 has been provided in the 2020 MCP, Section 5. As this work continues it will be provided in subsequent MCPs. Also see Section 9.4.2.	9
62	Section 8.3.2	The rationale for proposed metals and sulfate in sediments closure criteria is not detailed.	Provide the rationale for proposed metals and sulfate in sediments closure criteria.	The criteria proposed for metals in sediment in the MCP were the ANZG (2018) guideline values. A hazard	8



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
	Water and sediment – Management objectives and outcomes Table 8-2 Closure criteria – water and sediment			assessment has shown that these are not contaminants of environmental concern for the Ranger site. Updated water and sediment closure criteria is provided in Section 8.	
63	Section 7.8.3 – Surface water modelling Model results	<i>Based on the predicted downstream solute concentrations, and the magnesium-calcium ratios, the post-closure final landform does not pose a risk to the downstream environment.</i> There is currently insufficient information to support this statement and ERA is currently updating the surface water modelling to assess the risk of downstream impacts associated with contaminants from the post-closure landform.	Until it can be demonstrated otherwise, remove any statements within the RMCP suggesting that the post-closure final landform does not pose a risk to the downstream environment.	Updated. ERA is in the process of undertaking further updates to the surface water model. This updated information will be included in the next iteration of the MCP. More information is provided in Section 5.	5
64	Section 12.5.1 – Water & sediment monitoring Surface water and sediment	The proposed surface water quality monitoring program includes sulfate as a parameter at key monitoring sites on Magela and Gulungul Creeks. Given the risk of acid sulfate soil development on the Ranger Project Area and the Supervising Scientist’s rehabilitation standard for this parameter, it should also be monitored at RP1 (and other onsite waterbodies, while they are present) and Georgetown and Gulungul Billabongs.	Include sulfate as a water quality monitoring parameter at RP1 (and other onsite waterbodies, while they are present) and Georgetown and Gulungul Billabongs.	The post-closure monitoring program is updated and includes sulfate as a water quality monitoring parameter at MG009, GCLB, MCUS, GCC, and Coonjimba and Gulungul Billabongs.	10
65	Section 12.5.2 Water and sediment monitoring Groundwater	The proposed groundwater monitoring program does not clearly demonstrate that it will facilitate validation of groundwater models, or detect significant increases in contaminant concentrations in aquifers surrounding Pit 1, Pit 3 and the Tailing Storage Facility.	Revise the groundwater monitoring program to clearly demonstrate that monitoring will be undertaken at an appropriate spatial and temporal scale to: observe trends in groundwater level recovery and contaminant transport post-closure that can be used to validate groundwater models, and recalibrate if necessary detect significant increases in contaminant concentrations in aquifers surrounding Pit 1, Pit 3 and the Tailing Storage Facility, to enable downstream mitigation of impacts if required (i.e. groundwater interception or abstraction). Additional information obtained from ongoing post-closure solute transport modelling or new monitoring bores (including those planned to be installed in vicinity of Pit 1 and Pit 3 during 2019), should be used to refine and optimise the long-term groundwater monitoring plan.	The groundwater monitoring program has evolved over time to address operational and environmental concerns and risks at the Ranger Mine site. The post-closure monitoring plan has also evolved as the closure planning and modelling has progressed with the closure studies. Additional information informing the rationale for the post closure groundwater monitoring plan is detailed in Section 10.	10
66	Section 7.3.5.3 Plant available water studies Modelled plant available water	The transpiration rate input to the WAVES modelling is based on a subset of key overstorey tree species but does not capture the midstorey species that may account for a moderate to high proportion of the total cover.	Provide an estimation of the contribution of midstorey species (including evergreen species) to transpiration rates in the WAVES modelling.	The transpiration in midstorey species was not omitted in the modelling, rather it was overestimated. Stand transpiration of the reference sites in the Georgetown area was estimated based on the measurement of the average sap flux density (SFD) multiplied by the stand’s total sapwood area. The SFDs were measured in mostly overstorey (OS) species though some midstorey (MS) were also measured. Within scientific literature, it has been shown that overstorey SFD	5



A.2 SSB feedback on 2019 MCP

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
				is usually higher than MS. Therefore, the average SFD calculated from OS trees will overestimate the true average SFD of the stand. As the stand sapwood area is the sum of each tree's sapwood area in the stand including every OS and MS trees, the estimated stand transpiration used for modelling is indeed conservative.	
67	Section 11 Implementation	<p>Pit 1 (11.2.3) – states that <i>no contingency plans are required</i> i.e. missing contingencies for potential issues such as differential tailings consolidation, revegetation success, higher seepage rates, etc.</p> <p>Pit 3 (11.3.3) - only includes contingencies for the risk of tailings rising above -15 mRL i.e. missing contingencies for potential issues such as tailings consolidation taking longer than expected (e.g. extended water treatment as identified in BPT Section 9.2.7.4), differential tailings consolidation, revegetation success, higher seepage rates, etc.</p> <p>Tailings Storage Facility (11.4.3) - only includes contingencies for the risk of dredge disposal i.e. missing contingencies for risks for potential issues such as Tailings Storage Facility wall breach while still in use, management of contaminated materials (i.e. residual tailings on inside walls, floor, clay core, rip rap), and the contaminated groundwater plume.</p> <p>Water treatment (11.5.4) and Water management (11.9.3) - only includes contingencies for treatment of process water i.e. missing contingencies for treatment of pond water and risks associated with water quality closure criteria not being met (i.e. ongoing treatment).</p> <p>Waste and hazardous material (no Section) and Contaminated sites (11.5.3) - no contingencies included, noting it is acknowledged in 11.5.3 that contingencies for contaminated sites will be identified by future BPT assessments.</p> <p>Ecosystem restoration (no Section) – no contingencies included for the potential failure of the rehabilitated landform to become a self-sustaining ecosystem, which are also not included in the RMCP risk assessment.</p>	<p>Ensure that all contingencies associated with risks listed in the Ranger Closure Risk Assessment (Appendix 10.1) are included or referenced within the relevant areas within Section 11.</p> <p>Further detail should be provided for each contingency, including:</p> <ul style="list-style-type: none"> level of confidence in its likely effectiveness timing of implementation impact on the overall closure schedule, including consequential effects on other related activities <p>Include contingencies for the potential failure of ecosystem restoration (i.e. rehabilitated landform does not become a self-sustaining ecosystem).</p>	<p>Additional information has been included on contingencies within each domain of the implementations Section of the MCP (Section 9).</p> <p>Where possible the details requested have been provided, however in most cases this level of detail is not available and ERA believe not required. Contingency plans are developed to order of magnitude level and then are parked pending need. If need develops the various options are then assessed and progressed to engineering.</p>	9
68	Section 10.3 Closure risk assessment	The ongoing review process for the closure-related risks is not clear in terms of frequency, scope and how it informs future iterations of the RMCP.	Detail the ongoing risk assessment review process, including a plan to obtain additional information to update the risk assessment over time, and what would trigger an update of the risk assessment.	Details of ERAs closure risk management processes have been included in Section 7	7
69	Appendix 10.1 Risk assessment	To obtain the risk ranking, the controls are considered but those listed are a combination of existing controls, planned controls and contingencies (potential controls). If all of these elements are considered together, this may result in an artificial reduction in risk level by considering controls that aren't necessarily in place, or have a low level of effectiveness.	Clearly distinguish between the existing and proposed controls for the planned closure scenario, along with evidence to support control adequacy and effectiveness, including consideration of control applicability or availability during the three closure phases (i.e. decommissioning, stabilisation and monitoring and post-closure)	Controls that are not realised (still in progress or not implemented) are not considered in the risk evaluation and captured under "actions".	7

**ERA****A.2 SSB feedback on 2019 MCP**

Comment #	MCP reference	SSB comment	SSB recommendation	ERA response	2020 MCP Section
70	n/a	Insufficient details on future applications was provided.	The RMCP should include a table detailing the application, the expected date for submission, the date approval is required by, a description of the scope of the application and the information it will provide.	This was an accidental omission from the 2019 MCP and has now been again included in the 2020 MCP (Section 1)	1



COMMENTS FROM COMMONWEALTH MINISTER – APPROVAL LETTER RECEIVED 12 MAY 2020

A.3 Feedback from Commonwealth Minister on 2019 MCP

Comment #	Minister Pitt's comments	ERA Response	2020 MCP Section
71	I am conscious that ERA is entering a particularly important period at Ranger and wish to identify three specific areas that I request ERA address in greater detail in its 2020 MCP. Firstly, I request that ERA present closure criteria for my approval either in the 2020 MCP or earlier. I appreciate that this is a significant task and encourage ERA to continue to work with the Supervising Scientist in relation to closure criteria.	ERA have further developed closure criteria in consultation with the Supervising Scientist and the Northern Land Council and have reached agreement on the majority. These have been provided in Section 8. ERA are now requesting formal approval from the Minister for these agreed criteria. A few criteria are subject to the completion of scientific studies, these are due for completion in the coming 12 months and will be included for final approval in the 2021 MCP.	8
72	Secondly, I request that ERA provide further detail on the sequence of substantive rehabilitation works at Pit 3 and the Tailings Storage Facility and process water management activities which are planned to take place over 2021-22. As the timely implementation of these operations will be critical for ERA to achieve its planned closure schedule, I request that the 2020 MCP describe the risks associated with individual activities as well as how delays or issues could potentially affect related operations. Where possible, alternatives and contingencies should be identified.	Additional information on Pit 3 capping, the management of contaminated material in the Tailings Storage Facility, process water management has been provided in Section 9. In addition to this ERA will be submitting a separate application for the capping of Pit 3 for approval of the minister in Q4 2020. This will provide the full details of the rehabilitation works and mitigation measures to protect the environment. The 2021 MCP will then provide details of this application.	9
73	Thirdly, I request that ERA describe in the 2020 MCP its additional work to mitigate the risk that it is unable to collect sufficient seed stock to meet its revegetation requirements. ERA's revised risk assessment in the 2019 MCP identified this as a new critical risk. I therefore request that ERA advise what additional steps it will take to mitigate this risk.	<p>ERA have been undertaking a significant amount of work to mitigate this critical risk to the closure project. With the support of the Gundjeihmi Aboriginal Corporation, ERA has obtained a permit from Kakadu National Park for the local aboriginal business Kakadu Native Plant Supplies to collect seed from within the local provenance area in the park. Seed collection within the park has now commenced with successful results.</p> <p>In addition to this ERA have completed the following activities:</p> <ul style="list-style-type: none"> • commenced full scale seed collection activities with the Ranger Project Area; • completed construction of a Nursery on the RPA with security and fire systems to protect the seed; • storage of seed has been split in two locations in the case of a major incident at one location only half the seed will be lost; • ERA employees have been trained in seed identification and collection to allow for opportunistic collection on the Ranger Project Area <p>Based on the successful completion of these actions the risk has now been re-evaluated down to a high risk. High risks still require active management through ERAs risk management system; therefore, ERA will continue to actively monitor and manage this risk.</p> <p>Further details have been provided in Section 9.4.6.2.</p>	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
1	General	Glossary	Acronyms	Recommend spelling out rare, unusual, topic, chapter and Section specific acronyms. It is difficult to keep abreast whilst reading the MCP all the various acronyms. The MCP appears written by a number of different authors depending on the Section. Each Section introduces acronyms specific for that Section. Readers are therefore repeatedly required to try to remember topic-specific acronyms for parts of the MCP. Suggest writing out acronyms, especially those that are rare and/or unusual.	Acronyms have been minimised where possible, in particular for rare or unusual names. All key terms (names, locations, documents etc.) have been presented as acronyms (i.e. ERA, RPA, MCP, TSF). An acronym table has been included at the front of each Section as a reference to assist the reader.	ALL
2	General	MCP	'How to read this document' Section	Whilst the WA Closure Guidelines have been used, given the scale and size of the MCP, access into the document by stakeholders could be strengthened by a Section on 'How To Read' the document. Elements of this are throughout the Executive Summary.	Improvement will be considered as part of future submissions. For 2020 MCP, the table of contents and layout has been updated to further align with the WA MCP guidelines and will improving readability and identifying relevant information throughout. The Executive summary is intended to summarise Sections to follow.	ALL
3	General	MCP	Non-technical summary	It is recognised that the MCP is not statutorily required to be a public document. And that ERA has taken the progressive step to make it publically available. In this regard a Non Technical Summary would be a useful chapter.	Suggestion noted. ERA makes the MCP publically available for transparency. The MCP has been written for ERA employees and key stakeholders that have an understanding of the background and technical aspects.	ALL
4	General	MCP	Supplementary text	Throughout the MCP there is much supplementary information that supports closure planning and activities. It is recommended that this information be transferred to text-boxes to avoid disrupting the narrative in the body-text. For example, on ES 15 there is mention of a Closure Criteria Working Group. A text box could be used to describe who is in the group and its purpose.	ERA intends to ensure all supplementary information is provided where relevant. The format for presentation follows the WA MCP guidelines whilst effort is made to make linkages to additional information clear and easy to follow. For example, "Refer to Section 4" With the updated MCP guidelines this year there was a requirement to change the structure of the document. This did not allow time for any additional formatting improvement. These will be considered for subsequent updates.	ALL



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
5	Exec Summary	MCP	General comment.	<p>The Executive Summary reads more like a 'how to use- how to read this document' than an Executive Summary. The Executive Summary does not summarise impacts that have been identified and are mentioned throughout the summary.</p> <p>It misses simple visual aids for particularly non-technical Stakeholders to understand where on the Ranger Project Area the discussion centres, as well as whether that aspect of the closure plan is progressing satisfactorily, and the overall status of that aspect of the closure plan.</p> <p>It is noticed that there is not a Non Technical Summary.</p> <p>Considering the most important Stakeholder groups is the Mirarr Traditional Owners whose first language is not English, the Executive Summary should include a discussion on how the Mirarr Traditional Owners are being included in the development and progression of the closure plan.</p> <p>Such a discussion should include the intention to translate the closure plan or key aspects of it into an appropriate language either written or visual.</p>	<p>Comment noted. In following the WA MCP guidelines, the executive summary provides an outline of the Sections that follow. Specific results/outcomes of studies are often difficult to communicate without supporting context and detail and therefore are contained within the relevant Sections.</p> <p>Stakeholder consultation is a central part of the MCP development and progression. A number of forums have been organised to ensure closure planning involves representatives of the Mirarr Traditional Owners (i.e. NLC and GAC). Stakeholder engagement is referred to both in the Executive Summary and Section 4. The Executive Summary is updated to include more figures.</p>	Exec Summary
6	Exec Summary	ES-3 (2 Project overview)	The Commonwealth Government introduced laws covering the Alligator Rivers Region (Commonwealth Environment Protection (Alligator Rivers Region) Act 1978) and established several research bodies and committees to overview the environmental regulation of mining in the region.	Of mining or of uranium mining? If different bodies have different mandates please describe them.	The functions of the two committees mentioned are described in Section 4 of the MCP and further details are described in the Environment Protection (Alligator Rivers Region) Act 1978. They both relate to uranium mining.	Exec Summary
7	Exec Summary	ES-5 (3 Closure obligations)	It is implicit that ERA will comply with all necessary legal obligations and uphold internal standards during closure	What commits ERA to completing MCP in it's entirety?	The MCP is prepared with all information as required by Annex B of the Authorisation. The Plan provides updated information on an annual basis and at the end of closure will provide a record of all closure activities. A copy of the Closure Legal Obligations Register is also available as an Appendix to Section 3	3
8	Exec Summary	ES-6 (a.a.)	The transition into closure will involve applying for regulatory approvals to authorise new requests or to modify the currently authorised activities that have the potential to result in an environmental impact to either intact or undisturbed areas of the RPA.	The inclusion of an impact assessment of the chosen BPT would strengthen the MCP.	As described in Section 6, ERA adopts a site specific process to assess BPT and risk in relation to approval applications. Risks associated with the options during assessments are described in the applications when submitted.	6



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
9	Exec Summary	ES 10 (Table ES 2 radiation)	"ERA & SSB have developed a pre-mining radiation baseline"	EIA. The elements of an EIA are alluded to or mentioned through the MCP. A dedicated EIA would strengthen the document and the BPT choices made throughout it.	Previous BPT assessments and future BPT assessments are described in Section 6. A dedicated EIA will not be completed as part of the MCP as the MCP includes the specific elements as described in Annex B of the Authorisation and the minister approved guidelines (WA 2020).	6
10	Exec Summary	ES 6 (aa)	Historical land use within the Alligator Rivers Region has included indigenous occupation, buffalo hunting, missions, pastoral grazing, agriculture, mining exploration, uranium mining and tourism.	Which one is the MCP primarily designed to accommodate post-closure?	The 2020 MCP describes the final land uses in Section 8.	8
11	Exec Summary	ES-7 (4 Env & Social setting)	Terrestrial flora. On the RPA in 2013 a survey found "These species are common in surrounding Kakadu NP and did not include any threatened or rare species."	It seems unlikely that not a single local, regional, national or internationally identified threatened or even a rare species was identified. Has ERA independent verification of this finding?	<p>The cited 2013 Eco Logical Australia survey (Eco Logical Australia, 2014) covered only the potentially impacted area by the proposed Ranger 3 Deeps underground mine (see Figure 1: Proposed vent corridor within the survey area and RP1 outside the survey area, and Figure 6: Broad vegetation mapping groups, of the cited report). To be more precise, the sentence shall be revised as "These species are common in surrounding Kakadu NP and did not include EPBC and TPWC Act listed flora species".</p> <p>ERA has not independently verified this finding. However, this finding is consistent with Firth (2012)'s finding that was based on review of 20 past surveys on RPA.</p> <p>Reference: Eco Logical Australia. 2014. Vegetation and fauna assessment, for the proposed Ranger 3 Deeps underground mine. Prepared for Energy Resources Australia Ltd., Darwin. 2014. Firth, R. 2012. Flora and Fauna Literature Review of the Ranger Uranium Mine Project Area - Report 1. ENV Australia Pty Ltd. 25 June 2012, p 40.</p>	
12	Exec Summary	ES 10 (Table ES 2. Contamination)	In general, activities at the Ranger Mine are thought to have influenced the formation of ASS in some areas such as the Coonjimba Billabong and Retention Pond 1 (RP1) by affecting sulfide, sulfate and water balance dynamics.	This must form part of a detailed PAF management plan for post-closure, building on the Acid Sulfate Sediments site-wide ASS conceptual model.	Based on the results of the Acid Sulfate Sediments (ASS) site-wide conceptual model and field assessments, a risk assessment of domains across the mine site will be undertaken to understand the future ASS occurrences/persistence in the billabongs. If the risk assessment indicates sulfate in water needs to be reduced or ASS sediments treated, then trial mitigations and remediation options will be investigated. Refer to section 5.5.2.13	5



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
13	Exec Summary	ES 11 (Table ES 2 Water quality)	Surface water. Based on the predicted downstream solute concentrations, and the magnesium-calcium ratios, the post-closure final landform therefore does not pose a risk to the downstream environment. ... multiple projects including assessments of sediment accumulation, human diet and health, ecosystem vulnerability, release water pathways and cumulative aquatic risks will be conducted to assess if water quality closure criteria/objectives will be met under the current closure strategy.	Key impact assessment results. Summarising how ERA derived these conclusions – assumptions, methodology, etc – would strengthen stakeholder acceptance. An Impact Assessment is a good place to do this.	ERA is in the process of undertaking further updates to the surface water model. This updated information will be included in the next iteration of the MCP. More information is provided in Section 5.	5
14	Exec Summary	ES 13 (aa)	'use of low-permeability caps was preferred' which 'only have a marginal impact on loads' but 'these low permeability caps will not be required'	Can ERA clarify this as it is not clear whether low-permeability caps will be used or not.	ERA will not be using low permeability caps in Pit 3.	5
15	Exec Summary	ES 13 (Table ES 2 Landform)	The shape of the current final landform is largely determined by the requirement to maintain pre-mining drainage and catchment areas and to ensure stability in either current or the predicted climate/rainfall regime that will result from climate change.	First time climate change has been mentioned. Modelling for 10 000 years needs to consider climate change. Post-closure landforms and rehabilitation techniques need to demonstrate that Mirarr perspectives are considered.	Landform evolution modelling for 10,000 years does consider climate change scenarios. Synthetic rainfall data sets are being used to assess the design of the final landform for different wet and dry future scenarios. Mirarr considerations were included in the design of the Final Landform through the development of Cultural Closure Criteria consultation work completed by Murray Garde in 2014 (Garde 2015). See Section 8 for Cultural Criteria.	8
16	Exec Summary	ES 13 (aa)	Each version of the landform has been subjected to landform evolution modelling by the Supervising Scientist	Inclusion of Mirarr perspectives in final landform development and modelling should also be highlighted.	Mirarr considerations were included in the design of the Final Landform through the development of Cultural Closure Criteria consultation work completed by Murray Garde in 2014 (Garde 2015). See Section 8 for Cultural Criteria.	8
17	Exec Summary	ES 14 (Table ES 2 Ecosystem Rehabilitation)	ERA implemented a long-term fauna and flora monitoring program on the RPA and in adjacent areas of Kakadu NP (in agreement with Mirarr Traditional Owners and Kakadu NP Management).	Mirarr involvement should be explicit and visible in all final landform and rehab discussions and analysis.	Mirarr considerations were included in the design of the Final Landform through the development of Cultural Closure Criteria consultation work completed by Murray Garde in 2014 (Garde 2015). See Section 8 for Cultural Criteria.	8
18	Exec Summary	ES 14 (aa)	... development of fit for purpose closure criteria	Does this approach underlie all aspects of closure, incl: surface & groundwater, landform, rehab, etc? It is a nice sound-bite but should be true of all closure criteria.	The refined closure criteria statements presented in this MCP have been divided into two categories; proposed criteria for minister approval, and draft criteria for further review. These have been divided into separate tables in order to clearly identify those that have been agreed between stakeholder groups and are ready for finalisation with ministerial approval and those that require further review and consultation.	8
19	Exec Summary	ES 15 (8. Closure Criteria)	Closure criteria Working Group	Who is involved in this group? A textbox would be useful.	The CCWG was be a sub-committee of the Ranger Minesite Technical Committee (MTC) and was be chaired by ERA. Technical representatives from all stakeholder groups were invited. Ongoing Closure Criteria discussions are held through the MTC as required.	8



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
20	Exec Summary	ES 19 (11 Closure implementation)	ERA is committed to completing rehabilitation and the achievement of the environmental requirements.	This commitment should be at the front of the Exec Summary and closure plan. It is a/the key message of the MCP.	Noted.	Exec Summary
21	Exec Summary	ES 20 (aa)	... to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park.	This commitment should be at the front of the Exec Summary.	Noted.	Exec Summary
22	Exec Summary	ES 23 (Table ES 6 TSF)	... the TSF will be cleaned of all visible tailings	This is different to "11.2 By the end of operations all tailings must be placed in the mined out pits." as in the Environmental Requirements.	This has been updated for clarity. Refer to Section 9.3.3	9
23	Exec Summary	ES 25 (Table ES 6 Stockpiles)	All mineralised material not processed at the completion of milling in January 2021 will be placed well below final landform surfaces.	Presumably more detailed information on volumes, grade, depth of disposal will be presented.	Detail on volumes, grade and depth of disposal of hazardous waste was provided in the 2019 MCP. See Section 11.10: <i>Waste and hazardous material management</i> . This information is provided in the 2020 MCP in Section 9.4.2	9
24	Exec Summary	ES 25 (Table ES 6 Final landform)	(T)o validate design attributes such as landform stability, erosion topography, and visual amenity.	Please check punctuation. To what extent does social and cultural utility inform the design attributes?	Mirrarr considerations were included in the design of the Final Landform through the development of Cultural Closure Criteria consultation work completed by Murray Garde in 2014 (Garde 2015). This was presented in detail in Section 8.7 of the 2019 MCP. It is presented again in Section 8.3.6 of the 2020 MCP.	8
25	Exec Summary	ES 27 (12 Closure monitoring)	... for radiological performance has been structured around the exposure pathways for radiation due to the potential access to and final land use of the area.	A discussion on what the 'potential access to and final land use of the area' and how this is determined is necessary. Reference to where in the MCP this can be found would suffice.	This was presented in detail in the 2019 MCP in the Section 6, titled <i>Post-mining land use and closure objectives</i> . Due to the title of the section, ERA did not consider a cross reference to be necessary. The 2020 MCP describes the final land uses in Section 8.1	8
26	Exec Summary	ES 27 (aa)	Given the possible post-closure uses of the landform, the critical group will be Traditional Owners using the site for traditional activities	There is limited discussion about this critical group and how the closure plan is being developed in collaboration with them. Please include better linkage to the TOs and how the MCP is designed to address their being 'the critical group'.	ERA has a long history of stakeholder engagement with the Mirrarr people through consultation with the Northern Land Council (NLC) and Gundjeihmi Aboriginal Corporation (GAC). In 2014, ERA formalised this engagement regarding post-mining land use and closure criteria development with extensive consultation with Traditional Owners, through the consulting linguist and anthropologist Murray Garde. This report was summarised and refined for habitation, use of traditional plants and animals and the assumed post closure bush food diet (Paulka 2016). Details on the summarised report is described in Section 8.1.	8



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
27	Exec Summary	ES 29 (13 Financial provision)	Separate to this MCP, each year ERA prepares and submits an Annual Plan of Rehabilitation	Once the mine closure plan is live, there is no 'annual plan of rehabilitation' since rehabilitation is an integral part of closure. Can these not be integrated?	The plan for rehabilitation works has been detailed within the MCP. The Annual Plan of Rehabilitation (APR) is high-level, commercially sensitive information which is not appropriate for public release. This is provided separately for review to regulators and it is not suitable for public access.	11
28	Scope & Purpose	1-6 (1.3 Scope of MCP)	To plan for the retention and transfer of the airport for future use	... transfer of ownership of the airport ... ?	This has been updated to clarify "transfer of ownership." Refer to Section 1.3.	1
29	Scope & Purpose	1-7 (Table 1-1)	Closure. Period between 8 January 2021 & 8 January 2026. Decommissioning, completion of rehabilitation & transition of monitoring requirements	"Completion of rehabilitation" implies a functioning ecosystem, which is not possible. Suggest changing it to reflect the state of rehabilitation likely at 2026.	This has been updated to read "Decommissioning, completion of rehabilitation groundworks & transition of monitoring requirements". Refer to Section 1.3, Table 1-1.	1
30	Scope & Purpose	1-7 (1.4 Review and updates)	Section 11 addresses closure implementation and includes outlined schedules for the rehabilitation activities with the agreed assessment process and the draft content proposed for each additional application required for closure activities. The 2018 MCP was subject to stakeholder review and detailed feedback has been considered for the preparation of this document (Appendix A). The 2019 MCP incorporates substantive changes in content compared to the 2018 version, as outlined in the summary of changes table at the front of this document.	This is a repeat of the kinds of information in the Exec Summary. Suggest transferring from the Exec Summary such references to Sections in the MCP to this Section. Or the creation of a dedicated 'How to Read ...' or "What's in this document" Section.	Noted. This will be considered for future MCPs.	All



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
31	Project Overview	2 (2.1 Project overview)	Construction of the Ranger Mine began in January 1979 and the mine came into full production in October 1981. During the early stages of construction, the Commonwealth Government announced its intention to divest its interest in the project. Peko subsequently established a new company, Energy Resources of Australia Ltd (ERA), to purchase the existing partners' interests. Mining of the Ranger 1 orebody (Pit 1) was completed in December 1994 and development of the adjacent Ranger 3 orebody (Pit 3) commenced in 1996. ERA sells its product to power utilities in Asia, Europe and North America under strict international and Australian Government safeguards ³ . The company aims to maintain long-term relationships with its customers to meet their energy needs and provide a reliable supply of high quality product.	The paragraph starts with discussing start of construction, then migrates through ownership and finishes with customers. Essentially three distinct subjects in one paragraph. Recommend splitting the paragraph based on subject. The overall subject of this paragraph concerns commencement of civils and mining.	Updated to split paragraph	2
32	Project Overview	2 (2.1)	During the early stages of construction, the Commonwealth Government announced its intention to divest its interest in the project. Peko subsequently established a new company, Energy Resources of Australia Ltd (ERA), to purchase the existing partners' interests.	The discussion about the formation of ERA and where ERA sells its products is somewhat incompatible with the overall subject.	The history of the formation of ERA is an important note to have in the "History" section of the Project Overview. ERA also believes it is important to assure the public that all product from the Ranger Mine is distributed to countries under strict international and Australian Government safeguards.	2
33	Project Overview	aa (aa)	ERA sells its product to power utilities in Asia, Europe and North America under strict international and Australian Government safeguards ³ .	Perhaps shift this to a new paragraph about customers.	Updated.	2
34	Project Overview	aa (aa)	Potential of 30,000 to 40,000 T of contained uranium oxide.	"of contained"? Containing, with, of concentrated? Grammar seems incorrect.	The word 'contained' has been removed	2
35	Project Overview	3 (2.2 Overview of operations)	Sections 2.2.1 to 2.2.8 provide an overview of the components of the mining and processing operations at the Ranger Mine (Figure 2-1), including the associated key activities and infrastructure. Section 2.2.9 summarises the site wide water management system. Discussion on the closure of Jabiru East area and the Jabiru Airport are not included within the Mine Closure Plan (MCP).	Is the start of a Section on Overview of Operations the right place for these paragraphs? Generally an 'overview' chapter describes the methodology used to mine: Conventional open pit mining methods ... drilling & blasting (what equipment) ... transport to ROM (type of trucks) ... ROM ... primary crushers, secondary crushers, SAG AG mills ... concentrators ... use of chemicals ... thickeners ... driers ... etc ... A basic run through of the flow of ore from pit floor to transport off-site. Then the bit about when extraction finished, stockpiling took over, etc, leading to where Ranger is now.	These details are provided within the Mining Management Plan. Only a brief description of the operations (stages of mining) has been included in this section. Water management is integral to all stages of Ranger Mine operation and rehabilitation therefore a short summary is included here and discussed in detail within the Ranger Water Management Plan.	2



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
36	Project Overview	aa (aa)	Section 2.2.1 to 2.2.8	It shouldn't be necessary to continuously tell readers where in the document readers can find what. A dedicated Section can be provided for this. Shouldn't this Section simply start by describing the 'overview of operations'	The table of contents for each section provides a quick reference. To avoid repetition section references are placed within internal text to guide the reader throughout the document, given the document's large size and complexity.	ALL
37	Project Overview	15 (2.2.9.3)	[WLF] was designed primarily to polish ammonia from treated pond water permeate and uranium from surface water runoff	Please explain what 'polish' means in this context. A text box could be useful.	This has been updated to clarify. Refer to Section 2.2.9.6.	2
38	Closure Obligations	3 (3 Closure Obligations)	ERA is committed to...	Is there a commitments register or a list of key commitments? The ERs form the basis but there must be a number of ERA corporate, operations and closure commitments too.	ERA maintains a legal commitments register (Closure obligations register). Legal commitments pertaining to closure were included as Appendix 3.2 in the 2019 MCP. This register, expanded to include commitments made in relevant approvals, is included as Appendix 3.2 in the 2020 MCP.	3
39	Closure Obligations	aa (aa)	To ensure closure design decisions mitigate potential impacts	Is there a list of impacts and how they are to be mitigated and managed? Assessing the impacts of closure plan is (international) industry best practice.	BPT assessments are undertaken for all proposals to amend or introduce operational approaches, procedures and mechanisms to Ranger Mine during operation and closure. Please refer to Section 6 for the assessment criteria. Risk scenarios that result in the highest ranked potential impacts (class III and IV risks) were provided in Section 10 of the 2019 MCP. Section 7 of the 2020 MCP now provides this list as an analysis of threats and consequences to the environment that may result from closure operations. Section 9 of the Mine Closure Plan also describes contingency planning per domain for Rehabilitation works.	3, 7, 9
40	Closure Obligations	10 (3.2.1)	The Rio Tinto Closure Standard (HSEC-B-27) requires each Rio Tinto operation (globally) to develop and implement a plan for closure which sets the minimum requirements.	Suggests ERA does not have a suitable closure standard. Can ERA explain the relationship between RT and ERA?	ERA operates under the Rio Tinto Closure Standard which requires each Rio Tinto operation (globally) to develop and implement a plan for closure which sets the minimum requirements under the RT standards. Where site specific gaps exist, ERA standards apply (i.e. ERA BPT Assessment Standard).	3
41	Closure Obligations	aa (aa)	ERA Environmental policy	Does ERA have a dedicated Closure Policy, given the significance of closure relative to the project's authorisations?	ERA operates under the Rio Tinto Closure Standard which requires each Rio Tinto operation (globally) to develop and implement a plan for closure which sets the minimum requirements under the RT standards.	3



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
42	Closure Obligations	14 (3.4 Closure permits and approvals)	The transition into closure will involve applying for regulatory approvals to authorise new requests or to modify the currently authorised activities.	If closure planning is sufficiently advanced is there not the opportunity re-think the entire Authorisation to cover the entire phase?	The Authorisation administered under the Mining Management Act should be relevant and applicable to all closure activities. At times ERA will need to apply for specific approvals for activities that have not been approved through the MCP previously or that are not suitably covered by the existing Authorisation. To meet timeframes for implementation applications may need to be submitted outside of the MCP approval cycle to avoid delay. Responsibility for revisions of the Authorisation rest with the Northern Territory Government.	3
43	Environmental & social setting	2 (Climate)	associated with the effects of the El Niño Southern Oscillation, the Madden-Julian Oscillation and tropical cyclone activity ... Increased cyclone activity in the Australian region has been associated with La Niña years ...	It would strengthen understanding of these if there were a simple explanation as to why they are influential, perhaps in a text box.	Noted. This will be considered for future MCPs	5
44	Environmental & social setting	3 (aa)	When cyclones and tropical lows are present, the Alligator Rivers Region can experience high winds and rainfall.	Examples of when this has occurred and the wind speeds and rainfalls experienced would be handy. Text box?	Noted. This will be considered for future MCPs	5
45	Environmental & social setting	3 (4.2.2.1. Soils)	Iron oxyhydroxides	A simple explanation of what this is would be good.	Iron(III) oxide-hydroxide or ferric oxyhydroxide is the chemical compound of iron, oxygen, and hydrogen with formula FeO(OH).	5
46	Environmental & social setting	aa (aa)	be inherited from underlying Cahill formations schists	... as explained in Section 4.2.2.3 Geology and mineralisation	Updated	5
47	Environmental & social setting	15 (4.2.3.1 surface water)	Periodically submitted to the MTC for review	Text box of who/what the MTC is.	The Minesite Technical Committee is described as being formed as a result of the recommendation from the Fox inquiry. The definition of the MTC is now supplied in the Glossary attached to the 2020 MCP.	5
48	Environmental & social setting	17 (4.2.3.2 surface water chemistry)	whereas turbidity is high during the accessional limb, but decreases to a steady low during the recessional limb	Please explain what "accessional and recessional" limb is.	Accessional limb refers to the early period of the wet season when stream flow in Magela Creek is increasing. Recessional limb refers to the late period of the wet season when stream flow in Magela Creek is decreasing. This is now clarified in Section 5.2.8.2	5
49	Environmental & social setting	17 (aa)	indicates that generally'	"indicates" is 'general' only one needed.	ERA has chosen to keep the wording unchanged.	5



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
50	Environmental & social setting	18 (4.2.4 groundwater)	Most of the data are non-parametric...	The MCP is a public document as well is to be reviewed by people with different knowledge backgrounds. Topic specific word, such a 'non-parametric', will not be understood by all readers. To facilitate review and acceptance of the document strongly suggest simplifying technical terminology or using text-boxes to explain them.	Text is updated with new studies completed with regards to Background Constituents of Potential Concern in Groundwater. As a result this wording has not been included in the 2020 MCP.	5
51	Environmental & social setting	23 (4.3.1 Bioregions)	Most of the RPA lies within the northeast Section of the 28,520 km ² Pine Creek Bioregion. Features of the Pine Creek Bioregion include:	most of implies some of the RPA lies in another bioregion. Which is it?	A small (0.3km ²) section in the northeast of the RPA is contained within the Arnhem Plateau Bioregion.	5
52	Environmental & social setting	23 (4.3.2 National parks)	The RPA is surrounded by Kakadu NP ... (and) ... The RPA is also within 150 km of three other national parks: Warddeken Indigenous Protected Area (approximately	Does the indigenous protected area have the same protections as a National Park? If different suggest explaining what the difference is.	Mention of the additional National Parks and the Warddeken Indigenous Protected Area is made in order to describe the location of Ranger Mine. In accordance with the Primary Environmental Objectives of the Commonwealth of Australia for the Operation of Ranger Uranium Mine, ERA must ensure that operations at Ranger Mine are undertaken in such a way to: <ul style="list-style-type: none"> maintain the attributes for which Kakadu national Park was inscribed on the World Heritage List, and maintain the ecosystem health of the wetlands listed under the Ramsar Convention on Wetlands. It is for this reason that Section 5.3 details the attributes of the World Heritage listing attributes, the ecology of Kakadu and the Ramsar criteria, rather than listed the attributes of the nearby additional National Parks and the Warddeken Indigenous Protected Area.	5
53	Environmental & social setting	27 (4.3.3.1 vegetation)	... four vegetation types in the RPA dominated by eucalypt open forest and/or woodland (Figure 4-10). ... mostly co-dominated by Eucalyptus (E) miniata and/or E. tetrodonta.	Photos of the types of trees and the kinds of communities would be illustrative.	Photos of fauna and flora have been included in the MCP where relevant to supporting studies (i.e. Flowering and fruiting on the Trial Landform; directly seeded <i>Galactica tenuiflora</i> ; various grasses, herbs, sedges and vines that have naturally colonised the Trial Landform; Leguminous understorey self-colonisers on the Trial Landform and Fauna visitations. Please refer to Appendix 5.1	5
54	Environmental & social setting	28 (Table 4-6)	Area and proportion of vegetation communities on the RPA	The % of the RPA of communities means there is no mine footprint, since they tally to 100%. Suggest adding the mine footprint (disturbed) areas as a percentage to the RPA, and as a total of Kakadu. Is there any way to speculate what the community/ies is likely to be established or desired to be established on the mine footprint?	The table has been updated to clarify that this relates to the undisturbed or non-mining sections of the RPA only.	5



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
55	Environmental & social setting	33 (4.3.3.3 Fauna)	Kakadu NP contains over one third of..	The first impression suggests that they only occur in Kakadu, as in are endemic to. If not, perhaps simply better to put the number of species and mention it equals 1/3 of Australia's species.	ERA has chosen to keep the wording unchanged.	5
56	Environmental & social setting	aa (aa)	A number of conservation significant species (including a large number of mostly bird species listed under various migratory agreements) have	Suggest moving the bracketed text to the end of the sentence, since it's somewhat confusing when after discussing birds the 'identified species' includes the quoll, a mammal.	ERA has chosen to keep the wording unchanged.	5
57	Environmental & social setting	38 (4.3.3.4 Bushfires)	The management approach in Kakadu NP has been to copy the indigenous burning regime by using helicopter incendiary burning combined	The way it's written suggests that indigenous people used to fly helicopters to perform control burns	The indigenous burning regime is aimed at replicating the fine scale burning early in the dry season which is made easier by the use of helicopters by Park Management. Helicopter incendiary burning is a method used at the start of the dry season by Park Management to increase the burnt area in the early dry and as such decreasing the potential for late dry season burns. The section 5.3.3.4 has been updated to provide more clarity.	5
58	Environmental & social setting	aa (aa)	Further to this, a high fire frequency has been shown to have a propensity for producing a grass-fire cycle (D'Antonio & Vitousek 1992) where trees and shrubs are replaced by annual grasses	Has an assessment been made of the impact of climate change to success of re-establishing vegetation types on the RPA?	ERA has completed a Climate Change Risk Assessment which is discussed in Section 5.5.5 (Assessing the cumulative risks to the success of rehabilitation on-site and to the protection of the off-site environment). This risk assessment also discussed vegetation aspects.	5
59	Environmental & social setting	aa (aa)	Fire within the RPA is managed by ERA primarily for asset protection	Is ERA's fire regime in keeping with traditional indigenous fire practices? Or designed for ERA's specific needs? Will it change once operations and closure finish and post-closure begins?	During operations ERA's fire regime has been focussed on asset protection. In recent years with the transition to closure there has been more focus on traditional burning practices for weed and land management. It is expected that as closure progresses there will be more focus on the traditional practices and less need for asset protection.	5
60	Environmental & social setting	39 (4.4.1 Aboriginal culture)	Where necessary, sites will be protected from disturbance during closure activities by the implementation of management plans, barriers and awareness.	Where necessary' creates the wrong impression. Suggest starting with 'Sites will be protected by ...' which more accurately describes ERA's approach to protected cultural heritage sites.	This section has been updated (Section 5.1.1).	5
61	Stakeholder Engagement	9 (5.3 Ranger Mine Closure)	The SIA is scheduled for review in late 2019	Has the SIA been reviewed? If so, when will the results be described in the MCP, and how the results influence the MCP?	ERA will update the SIA in early 2021 to incorporate both specific information on the cessation of Ranger Mine operations and recent developments around the future of Jabiru	4



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
62	Post-mining land use	1 (6.1 post-mining land use)	The Environmental Requirements (ERs), conditions of the Section 41 Authority issued under the Atomic Energy Act 1953 and appended to the Ranger Authorisation (as Annex A) issued under the Mining Management Act 2018 (NT) (Section 3.1.3) specify that the Ranger Project Area (RPA) must be rehabilitated	Suggest prefixing the word 'Section' with something that informs the reader that the Section in question is in the MCP and not, as initially read, in one of the documents above, such as in the Mine Management Act. This comment is applicable throughout this Section.	To improve clarity, this particular reference to Section 3 of the MCP has been changed to "MCP Section 3" as the reference to this Section is relevant. All other references to Sections of the MCP were reviewed and established to be free of ambiguity.	8
63	Post-mining land use	1 (aa)	extensive consultation with Traditional Owners regarding their planned use of the site which resulted in the Garde report (2015).	It may be illustrative to describe in a text box what the purpose of the Garde report is .	Reference to work undertaken by Murray Garde has been modified to clarify the purpose of his consultation. Refer to Section 8.1.	8
64	Post-mining land use	2 (aa)	Aboriginal people indicated that a familiarisation of young people with certain cultural sites on the RPA post-rehabilitation would be desirable	Young people in general or young Mirarr people?	The word Bininj has been included to improve clarity.	8
65	Post-mining Land-use	2 (6.2 Closure objectives)	...as to what the proponent...'	The proponent? Or ERA?	In this case, the proponent is ERA. As this is a reference to WA guidelines, wording has been kept as per the referenced guidelines.	8
66	Supporting Studies	General	Chapter is not specifically about how ERA intends to close the Ranger mine.	The information in this Chapter concerns studies which underpin strategies of different aspects of the closure process. At 322 pages it is a substantial document which does not add much value to the actual closure plan. As in, it is not about closure per se. Recommend appending it to the mine closure plan, referring to it when relevant. The focus of the MCP should be on what ERA intends to do to close the site in compliance with legislation and SH expectations.	The information in this Section incorporates the scientific studies to establish a baseline (pre-mining) case while also sharing a summary of the current technical knowledge base including site conceptual models. This is in accordance with the WA Mine Closure Plan Guidance. An integral part of Ranger's progressive rehabilitation and closure is addressing the knowledge needs (gaps) to assess the post-mining environmental impact as well as studies to inform regulatory requirements, operational investigations and global emerging issues like climate change. ERA believe this section is an important section to include as part of the MCP and not as an appendix.	5



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
67	Supporting Studies	53 (General comment from text)	The micrometeorological feedback of the sensitivity of transpiration to a marginal change in stomatal conductance at the stand level is regulated by a dimensionless decoupling coefficient proposed by McNaughton and Jarvis (1991).	The various Sections in the chapter appear written by experts. The style or writing and terminology can be difficult for non-experts to understand. Suggest the experts/authors are directed to be more descriptive and use less complex terms. Or have the Section edited by a suitable editor.	This Section is aimed at providing scientific evidence for Closure planning. It is aimed at a technical audience to addressing the knowledge needs (gaps) to assess the post-mining environmental impact	5
68	Supporting Studies	95 (General use of brackets)	The criteria for site selection included: vegetation community (similar to those to be established on the final landforms), fire regime (captures variability of vegetation communities under different fire regimes), surface geology/soils (similar to those identified in the final landform vegetation communities), position in the landscape (captures the variability in crest, upper/mid/lower slope vegetation communities), cultural heritage (no impact on cultural heritage), access (easy access during all seasons and in the long term) and weed status (weed free at time of establishment). The criteria were consulted with relevant stakeholders and experts. Based	Throughout the MCP (as opposed to the MMP) there is the propensity (albeit with good intentions) to use too many () (which is a sign that the body text (that which is not in the ()) is insufficiently explanatory. Rule of thumb is to simplify body text to avoid needing () . Over us of () breaks up reading of the document and thus makes understanding it more difficult.	Noted and will be considered in future submissions of the MCP.	5
69	Closure Criteria	Closure criteria status (Section 8.8)	Closure criteria status (Section 8.8)	The last Section in the chapter - 8.8 - describes the status of the closure criteria. It would be preferable to have this Section at the front of the chapter, as it is the most important part of the chapter, then structure the rest of the chapter around it. Reading the other Sections 8.1 – 8.7 there is an impression that selection of the closure criteria is not well advanced. In Section 8.8 the reader is informed that a large number of criteria have been agreed.	The refined closure criteria statements presented in this 2020 MCP have been divided into two categories; proposed criteria for minister approval, and draft criteria for further review. These have been divided into separate tables in order to clearly identify those that have been agreed between stakeholder groups and are ready for finalisation with ministerial approval and those that require further review and consultation.	8



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
70	Closure Criteria	14 (8.3.3 Justification of outcome...)	Traditional Owners have reported concerns about trying to integrate cultural values with the 'scientific, legal and technical domains of a process that will take place within a framework controlled by those from the dominant non-Indigenous culture' (Garde 2015).	Can ERA explain more about their approach to address the concerns of TOs regarding integrating cultural values with scientific, legal and technical aspects?	Further information regarding engagement with Traditional Owners and the integration of cultural values with non-indigenous scientific, legal and technical domains was provided in the 2019 MCP in Section 5, Stakeholder Engagement and Section 8.7.1 of Closure Criteria. These Sections are within the 2020 MCP as Section 4 and Section 8.3.6.	4 and 8
71	Closure Criteria	30 (8.4.1.2) Radiation effects	These detail frameworks for assessment of risk through the comparison to a benchmark dose rate value that is considered to provide an acceptable level of protection to the environment	Where is the benchmark documented? Can ERA explain more about this benchmark? Text box?	The definition for benchmark dose rate has been added to the glossary at the beginning of Section 8.	8
72	Closure Criteria	8.6.1 Justification for outcome ...	The closure criteria for flora and fauna (Table 8-5) were developed through information from appropriate reference sites and rehabilitation trials ... This model is key to defining the target ecosystem/s and will determine the quantitative, semi-quantitative and/or qualitative closure criteria for assessment of success	The first tells the reader that closure criteria 'were developed', that is, they exist. The second tells the reader that closure criteria 'will be determined', that is they do not exist. Please resolve the discrepancy.	It is explained within the same paragraph of the Section 8.6.1 of the 2019 MCP, that 'It is generally understood that the ecological attributes and parameters proposed for the assessment by ERA are sound, however the criteria may be further revised once the conceptual model is further developed and/or finalised'. Hence, the correct statement that the criteria 'were developed' and the equally correct statement that the model is key to determining the 'quantitative, semi-quantitative and/or qualitative closure criteria'. Section 8.8.5 of the 2019 MCP expounds on this, noting that a number of studies were underway that would provide results to refine and finalise the closure criteria. The refined closure criteria statements presented in this 2020 MCP have been divided into two categories; proposed criteria for minister approval, and draft criteria for further review. These have been divided into separate tables in order to clearly identify those that have been agreed between stakeholder groups and are ready for finalisation with ministerial approval and those that require further review and consultation.	8
73	Closure Criteria	8.8 Status of closure criteria	The Supervising Scientist has developed a series of rehabilitation standards for Ranger Mine (Table 8-9) against which the Supervising Scientist will judge the success of the rehabilitation	Is this the same as closure criteria? It would be expected that stakeholder agreed closure criteria would be the universal criteria against which rehabilitation is judged.	The closure criteria are the final agreed parameters for assessing the performance of rehabilitation. The rehabilitation standards developed by the Supervising Scientist are guiding standards of an advisory nature only. ERA work closely with the SSB, and all other MTC members as part of the Closure Criteria Working Group in developing the closure criteria and refer to the rehabilitation standards when establishing parameters, however, the standards will not necessarily be integrated in their entirety into the closure criteria.	8



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
74	Best Practicable Technology	7 (9.2 Completed BPT)	Completed closure related BPT assessments	Is there a valid reason to have 24 pages of completed closure-related BPT assessments this Section in the MCP? It discusses how ERA applied BPT to various activities and technologies which are now in the MCP. Important is to know that ERA applied BPT to all technologies and techniques in the MCP. And will do for future ones. The MCP should focus on closure planning and activities. Information such as Section 7: supporting studies, and this Section from 9.2 could be appended. It would reduce the size of the actual MCP, yet keep information available for stakeholders.	Suggestion noted. Consideration will be given to restructuring this section in future submissions. In accordance with the requirements of the WA Mine Closure Plan Guidance for baseline and closure data and analysis, a summary of supporting studies is provided within the body of the Mine Closure Plan. Relevant technical reports are provided as appendices.	6
75	Risk Assessment	3 (10.2 previous risk assessment)	Previous risk assessment	Section has strong links to the BPT assessments of the same infrastructure. Is there a way to link them directly in the same Section?	BPT assessments are undertaken for all proposals to amend or introduce operational approaches, procedures and mechanisms to Ranger Mine. As such, the BPT assessments address a narrower field of activities than the closure risk assessment, which covers all potential environmental risks of closure, be they associated with new proposals or ongoing activities. Although there is a strong linkage between the two Sections, they remain separate.	6
76	Risk Assessment	3 (aa)	Ranger closure feasibility study 2018: risk assessment	Is this the overarching risk register for the Ranger mine including the MPC? If so, can ERA briefly describe the overall risk register and what else it pertains to?	All risks relevant to the Closure of Ranger Mine is described in Section 7	7
77	Risk Assessment	4 (10.3 closure risk assessment)	Outcomes from this risk assessment will continue to be reviewed and additional risks identified during internal or external workshops (e.g. the cumulative risk assessment currently being run by Supervising Scientist Branch (SSB))	How many risk assessments relevant to the MCP exist? Can they be cross-referenced & compiled into one? A brief explanation of the SSB's 'cumulative risk assessment' would be informative. It is not included in the preceding Section.	There is a single ERA closure risk register. This has been constructed from previous assessments and updated over time to reflect current status. This Section describes each preliminary assessment that has taken place and recent updates. The outcomes of SSB Cumulative Assessment will be presented as per their own schedule.	7
78	Risk Assessment	5 (10.4.2 Purpose and objective)	The purpose of the closure risk analysis was to identify and evaluate the consequences and significance of the threats on the surrounding environment associated with the closure of Ranger Mine, effective 8 January 2026	It seems to very similar to that of an impact assessment. Strongly recommend the MCP include an impact assessment.	The layout and format of the MCP is in line with the WA MCP Guidelines. An impact assessment was not identified in the feasibility study and a number of independent studies (addressing numerous issues) have been scheduled. Reports of these will form the overall assessment.	7



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
79	Risk Assessment	5 (aa)	<p>The three phases of closure: decommissioning, stabilisation and monitoring and post-closure. Decommissioning commences at the completion of processing, currently scheduled to end in 2020, and will continue to 2026. Decommissioning includes the general works associated with rehabilitating the site to an agreed standard of environmental protection and the re-contouring and revegetation of the final landform. The stabilisation and monitoring phase is the period post-decommissioning where active works have generally ceased and the progression towards the development of a long-term viable ecosystem and achievement of closure criteria has commenced. This phase may require initial management as landform settling, subsidence and erosion occur, and vegetation establishes. Passive water management techniques will be implemented where required. The post-closure phase occurs when monitoring has demonstrated the closure criteria have been achieved and a close-out certificate has been issued. It is in this period the site will be returned to the Traditional Owners, and the site may be incorporated within Kakadu NP.</p>	<p>3 closure phases:</p> <ol style="list-style-type: none"> 1. 2020-2026. Decommissioning. rehabilitation, recontouring, revegetation. 2. >2026-closure criteria achieved. Stabilisation & Monitoring. Development of long term viable ecosystem. 3. Post-closure. Close-out certificate issued. Site returned to TOs, able to be incorporated into Kakadu National Park. <p>This is the key overall long-term conceptual plan. Suggest placing it at the front of the MCP. Describes how ERA defines the key phases: decommissioning; stabilisation & monitoring, & post-closure.</p> <p>The MCP could be constructed based around these phases.</p> <p>Has ERA achieved consensus from stakeholders - NLC, SSB, DPIR, DIIS - on the definition of The Three Phases of Closure ?</p>	<p>The phases of closure have now been included in Section 1 of the MCP (Table 1-1). These phases were all agreed with stakeholders as part of the early work of the MTC working group "Closure Criteria Working Group".</p>	7



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
80	Risk Assessment	aa (aa)	decommissioning, stabilisation and monitoring and post-closure.	<p>This is good and important info and could/should be much earlier in the document</p> <p>1. Decommissioning Decommissioning commences at the completion of processing, currently scheduled to end in 2020, and will continue to 2026. Decommissioning includes the general works associated with rehabilitating the site to an agreed standard of environmental protection and the re-contouring and revegetation of the final landform.</p> <p>2. Stabilisation & Monitoring The stabilisation and monitoring phase is the period post-decommissioning where active works have generally ceased and the progression towards the development of a long-term viable ecosystem and achievement of closure criteria has commenced. This phase may require initial management as landform settling, subsidence and erosion occur, and vegetation establishes. Passive water management techniques will be implemented where required.</p> <p>3. Post-closure The post-closure phase occurs when monitoring has demonstrated the closure criteria have been achieved and a close-out certificate has been issued. It is in this period the site will be returned to the Traditional Owners, and the site may be incorporated within Kakadu NP.</p>	See response to comment #79	7
81	Risk Assessment	6 (10.4.4)	The hazards were analysed to identify any significant risk to human health, safety or the natural environment with all current and proposed mitigation measures in place	<p>'hazards analysed with mitigation measures in place' A text box informing the reader about why analysing hazards with mitigation measures in place, vs not in place and the difference would be handy.</p>	<p>For the purposes of developing the closure risk profile by reviewing existing risk assessments, hazards were analysed with mitigation measures in place as inherent and current risk had already been identified and the mitigation measures applied would remain.</p> <p>Without mitigation measures in place the risk evaluations would show a different profile.</p> <p>The use of text boxes will be considered for the 2021 MCP.</p>	7
82	Risk Assessment	13 (Table 10.5)	Threat code: heading of columns on the left of table.	Explanation of Threat Code required to understand how these columns work.	<p>Table 10-4: page 10-11, provided the risk breakdown structure/Threat code explanations in the 2019 MCP.</p> <p>The equivalent information is now found under 7.3.5 Risk Relationships in the 2020 MCP.</p>	7
83	Risk Assessment	16 (aa)	Insufficient volume or quality of viable seed stock available for whole of site revegetation	<p>The only Class IV risk. The Threat Code does not inform the reader that this is a Class IV risk. Table would be strengthened by have the risk Class clearly indicated.</p>	Appendix 7.1 Ranger Closure Risk Assessment provides the risk management class I – IV.	7



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
84	Risk Assessment	18 (aa)	Large scale fire or natural disaster (e.g. cyclone) destroys immature vegetation.	This threat is repeated on the same page of the table albeit with a threat code.	This has been rectified in Appendix 7.1 of the 2020 MCP.	7
85	Risk Assessment	20 (10.5.1)	Insufficient volume or quality of viable seed stock.	<p>What about the risk to produce the number of viable tubestock to meet revegetation targets by 2020?</p> <p>Especially when Threat Code T C 04 01 Low plant survival rate states under evaluation rationale that an "additional 20% plants die" which suggests a high mortality rate (additional to what rate?). The risk table does not mention desired/required viable tubestock numbers.</p>	<p>Appendix 7.1 shows detail on the following related risks;</p> <ul style="list-style-type: none"> Insufficient volume or quality of viable seed stock available for whole of site revegetation [504574] Insufficient volume or quality of trees from nursery for revegetation [505249] Low plant survival rates in the field during establishment and vegetation decline after/at establishment [504500] <p>The related controls are:</p> <ul style="list-style-type: none"> Revegetation strategy designed to meet closure criteria for resilience (e.g. species mix, irrigation, weed monitoring, viability/germination rate/mortality rate/large scale failure contingency) [602395] 20% allowance for infill. [505250]. 30% allowance for unviable seeds. [505251]. <p>The 20% allowance for infill [505251] specifically addresses the mortality rate across multiple species and multiple target ecosystems. Tubestock numbers are managed via the Revegetation Management Plan.</p>	7
86	Risk Assessment	10.5 and 10.6	Discussion on Class IV and III risks	<p>Is it necessary to repeat what is well represented in Table 10.5?</p> <p>Table is actually easier to read and absorb information.</p> <p>What is missing from Table 10.5 is likelihood of occurrence of the risk. It may be in the Threat Code, but without it clarified it is not clear.</p>	<p>The risk ranking is made up of both likelihood and consequence. The majority of risks have multiple consequences, therefore it is not possible to include this in simple table. The inclusion of the likelihood without the consequence did not seem to add value so this has not been included.</p> <p>If required the additional information on consequence and likelihood of threats could be provided separately the regulator.</p>	7
87	Implementation	11.2.1 Closure activities	Closure activities, eg bulleted lists of historic timelines concerning key infrastructure, Pit 1, Pit 3, etc	Perhaps this could be shifted to Chap 2_project overview. It's good background info but it's historic. Or as an appendix to this chapter. This Chap is or should be forward looking	This section includes a summary of completed rehabilitation to date has been summarised for each Closure domain. Each domain's historic, current and planned activities (including contingencies) have been kept together in the Implementation section.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
88	Implementation	aa (aa)	ERA commenced deposition of tailings within the mined-out Pit 1 in August 1996. This followed an initial Application to the Minesite Technical Committee (MTC) to deposit neutralised tailings into Pit 1, which was approved by the NT Minister in September 1995 (ERA 1995). In May 2005, ERA sought regulatory approval to increase the tailings deposition level in the pit to an interim 12 mRL, which was received in August 2005 (ERA 2005). Between 1996 and December 2008, ERA deposited approximately 18.9 Mm ³ (25.6 Mt) of tailings into the pit (ATC 2012, CSIRO 2014). Concurrent with tailings deposition, Pit 1 was also used to store process water.	There is a lot of such ancillary information through this and other chapters and Sections. Understandable why ERA would like to include it. However, it does not actually inform the reader what's happening or will happen regarding closure of the mine.	Each domain's historic, current and planned activities (including contingencies) have been kept together in the Implementation section	9
89	Implementation	9 (11.2.1. Pit 1 closure activities)	With due consideration given to the outcomes of the relevant risk assessments and, in particular, the range of existing and proposed controls required to eliminate, minimise or mitigate the identified risks.	Whilst this is reassuring, it could be included in Chap 10: risk assessment. Here the reader wants to know how ERA is going to finalise the work on Pit 1. The reader is not taking for granted that ERA is considering risks. ERA has specifically addressed that in Chap 10.	Noted, ERA considers it important for the reader to be clear that risk mitigations are taken into account for closure implementation planning. This paragraph has remained unchanged.	9
90	Implementation	9 (aa)	Pit tailings flux; 1s & 2s waste rock	This is the first time the reader encounters these terms. A short description, perhaps in a text box, would be handy.	This has been updated to clarify. Refer to Table 9-3. Waste characterisation is also discussed in Section 9.4.2.	9
91	Implementation	10 (aa)	Modelling has predicted total consolidation settlement after placement of backfill.	After placement of backfill' presumably has no time limit. Given limitless time, tailings will consolidate. Can ERA provide more information in terms of the time it takes for consolidation and what risks &/or impacts to Closure objectives result from that?	Section 5.4.1 describes the current tailings consolidation models for Pit 1 and Pit 3. After completion of tailings deposition into Pit 3, the tailings consolidation model will be updated	5



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
92	Implementation	12 (11.2.1.2 2s waste rock)	... characterised over the past 35+ years of mining	This or similar is mentioned quite a few times: monitoring, research, investigations, mining ... 35 to 40 years of experience, etc. It really only needs to be mentioned once perhaps in a History/Work To Date Section. A lot of similar information extraneous to the Chapter/Section could be placed in such a Section. In this Section - Implementation – ERA is trusted to have done all the background work necessary to understand why the implementation activities have been chosen. Reference can be made to where supporting studies, etc, can be found.	Noted	
93	Implementation	12 (aa)	The U3O8 content of 1s waste rock is less than 0.02 wt%, and 2s rock (very low-grade ore) is 0.02 – 0.05 wt%.	Perhaps place in a table showing key characteristics of the different classes of waste rock (& stockpiles). Eg table 11-18	A waste characterisation section has been included and the table updated (Section 9.4.2 Table 9-37)	9
94	Implementation	14 (11.2.2 Schedule)	Pit 1 backfill, final landform contouring and ripping is schedule to be completed by mid-2020.	For when information describing schedule like this is presented in text, perhaps place the relevant part of App 11.1 as a visual guide. Also perhaps place a small schematic map of the direct impacted area with the area under discussion highlighted to assist the reader in understanding where they are. Perhaps based on Fig 11.66	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
95	Implementation	5 (11.2.4 Pit 1 current research)	The outcomes of the monitoring and studies will be used to address relevant Key Knowledge Needs (KKNs) (Appendix 7.1).	Is there enough time to generate information to be used in the rehabilitation of other impacted areas? If not, what is the contingency to guide the rehabilitation of other areas?	Pit 1 is now completed and various studies are planned to commence this year. The main bulk material movement does not commence until 2023, this gives sufficient time to incorporate any additional learnings into future closure planning.	9
96	Implementation	16 (11.3 Pit 3)	Closure activities, bullet list	Perhaps this could be shifted to Chap 2 project overview. It's good background info but it's historic. Or as an appendix to this chapter. This Chap is or should be forward looking	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
97	Implementation	17 (aa)	MTC describing the assessment of potential environmental impacts from the interim final tailings level in Pit 3	An impact assessment should be done for all aspects of the closure plan. It would complement the risk assessment.	See response to comment #9	
98	Implementation	18 (aa)	Installation of geofabric	What is the expected lifespan of the geofabric? Why is it needed? What happens when it no longer functions as designed?	The geofabric is required to provide sufficient geotechnical strength to allow for the capping works on Pit 3 to commence. It is only required for a short period, until sufficient strength is obtained through the placement of the cap itself.	9
99	Implementation	19 (11.3.1.1)	Tailings deposition	The desired outcome -19.7 mRL could be mentioned here.	This has been updated. Refer to Section 9.3.2.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
100	Implementation	aa (aa)	depositing of tailings into the facility in such a manner to reduce tailings segregation that will compromise their structural integrity	Can ERA add a short description about how the deposition strategy will actually ensure the required surface (bullet one) and reduce segregation? The bullet points do not provide sufficient backup to have confidence in the statements. Later in the text it's stated that 'low discharge solids concentration' and 'fluctuation of process water volumes' resulted in segregation. Can ERA explain more clearly the outcomes of the tailings deposition strategy, risks, impacts and contingencies?	This has been included in Section 9.3.2	9
101	Implementation	20 (aa)	Residual tailings on the walls and floor that cannot be dredged from the TSF may need to be transferred by truck (Section 11.4.1.1). Plans to deposit this material into Pit 3 will be developed, if required, and included in future updates of this MCP. Tailings are recovered from the TSF with a diesel-powered cutter suction dredge. The slurry produced by the dredge varies between 18 and 28% by weight solids, depending on the type of tailings solid material (i.e. fine or coarse) and on the action of the dredge cutting head as it sweeps from side to side.	Re: point about further information on the tailings deposition and surface and segregation, the description on how deposition will achieve this needs and could be of a similar length and detail as to how the tailings are to be (are being) transferred.	Noted. ERA are currently working on plans for the TSF floor clean that include deposition into Pit 3. All available information to date has been included in Section 9.3.3	9
102	Implementation	20 (aa)	demonstrated that the revised	Is this sentence correct or is there something that should come after 'the revised'? technique?/methodology/?	This has been updated to clarify. Refer to Section 9.3.2.1.	9
103	Implementation	22 (aa)	The purpose of the trial was to test the operability and maintainability aspects of the subaqueous deposition system, to develop standard operating procedures and modify the design of the system if required. A number of options for a subaqueous deposition system were identified and assessed as part of the system design and development. The final option chosen was a novel diffuser (Figure 11-12). The diffuser design was developed in conjunction with CSIRO Mineral Resources (Clayton, Victoria) who completed a series of computational fluid dynamics (CFD) simulations of subaqueous discharge into Pit 3, aimed at understanding the nature and distribution of tailings discharge into the pit.	Whilst the CSIRO diffuser design is interesting, it is not sure whether this information is needed here. There's a Chapter on BPT where it could be discussed.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
104	Implementation	25 (aa)	Key elements of the subaqueous deposition system are:	Useful information that along with a similar description of sub-aerial deposition should be much earlier in the Section. It is how the tailings are to be deposited.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
105	Implementation	29 (aa)	The basis of the plan is to fill in the deep void at the western end of the pit. At the end of 2020 the coarse/fine interface will be at about -36 mRL.	As this is the 'basis of the plan' perhaps place it be at the front of the Section.	The section on tailings deposition has been updated and a new structure used for this section.	9
106	Implementation	29 (aa)	At the end of tailings deposition the bulk of the tailings will have a near horizontal surface of approximately -19.7 mRL.	The desired outcome. Perhaps place early in the Section discussing tailings deposition.	See response to comment #105	9
107	Implementation	29 (aa)	The wedges of tailings above -19.7 mRL have a very small volume of about 30,000 m3.	Can ERA clarify these wedges shall cause no problem to the remainder of the Pit 3 closure strategy and post-closure behaviour?	See response to comment #105	9
108	Implementation	29 (aa)	Given that tailings will remain lower than the surrounding groundwater heads in the formations surrounding Pit 3 during both deposition and consolidation, the hydraulic gradient will always be towards the pit.	"the hydraulic gradient will always be towards the pit". Can ERA place temporal constraints on this? Will the hydraulic gradient be towards the pit even long after closure? If so, for how long, etc? If this is discussed and clarified elsewhere in the document (Chap 7 for example), a reference to it would suffice.	Groundwater gradients will remain towards Pit 3 during tailings deposition and consolidation due to the operation of the Pit 3 decant system. As part of the post closure solute transport modelling currently underway, head recovery modelling is included in the scope to establish when groundwater gradients will change and Pit 3 will no longer act as a groundwater sink, Section 5.5.2.9..	5
109	Implementation	33 (11.3.1.2 consolidation modelling)	The key outcome of consolidation analysis is that the predicted time to reach practical completion of consolidation, that is removal of 95 % of mobile consolidation water, is June 2025, which is prior to the legislated closure date of 1 January 2026.	A key outcome. Recommend placing it at the beginning of the Section for ease of reader access.	See response to comment #105	9
110	Implementation	35 (11.3.1.3)	However, it is apparent that upon reaching the decant pond the mill tailings still segregate.	Please ensure the conclusions of experts following analysis of data are suitably clarified for readers who are not expert in that particular field. Adverbs and adjectives describing how obvious, clear, apparent, etc, conclusions are may not be for non-experts.	Noted	
111	Implementation	36 (aa)	Fig 11.20: contour plan of settled tailings surface "... and end of consolidation surface shown in Figure 11.20."	It is not clear that the reference in the text actually references Fig 11.20	See response to comment #105	9
112	Implementation	37 (11.3.1.4)	Groundwater and contaminant transport modelling ... The risk to the Magela Creek ecosystem ...	Is this in the right place? It discusses risk, not implementation. If ERA wish to reassure the reader that the risk to Magela Creek has been assessed, refer them to the relevant Section in the Risk Assessment.	Groundwater modelling has been moved to Section 5	5
113	Implementation	43 (11.3.1.6)	It is noted that the geosynthetic will be laid over the wick drains but will not inhibit their performance.	How sure is ERA regarding this? Can ERA provide technical analysis demonstrating this?	This is the method used for Pit 1 that has worked.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
114	Implementation	46 (Fig 11 - 31)	Legends and other information	The on-screen legends and other writing on diagrams are often very difficult to read. Enlarging does not solve the problem. It would benefit the MCP if the diagrams were more readable.	Diagrams and figures throughout the MCP have been updated to clarify.	All
115	Implementation	11.3.1.10 Bulk backfill	General note. 1st paragraph: "The total waste rock fill "	This is an example of how some information in the MCP that's not really needed. The key info is that 67M tonnes is to be placed. Mineralised material first. The comparison to Pit 1 ("As with Pit 1") doesn't add value to the key information, nor does the complexity of transport which could be discussed in a 'transport and logistics Section' if important. The lessons from Pit 1 inform the Pit 3 approach and should be mentioned, but in a general sense in a discrete Section at the start of, say, Chap 11.	Noted	
116	Implementation	48 (Table 111-6)	Progressive tasks for closure of Pit 3	This list could/should be at the front of the 'close pit 3' Section as a roadmap for the Section for the reader.	See response to comment #105	9
117	Implementation	49 & 55 (11.4.1.6 TSF closure activities)	TSF needs to be cleaned of all visible tailings, infrastructure and foreign objects prior to use as a process water storage. The current basis for floor cleaning is that visible tailings need to be removed.	The Environmental Requirements 11.2 state that "... all tailings must be placed in the mined out pits". Not all 'visible tailings'. Please clarify the discrepancy.	ERA are currently working on a plan for demonstrating compliance with ER 11.2 and will be providing this to stakeholders for comment later in 2020.	9
118	Implementation	59 (11.4.1.6 Dredges removal)	Disposal of the dredging equipment in the TSF is the most straightforward and viable option and represents the base case option.	Can ERA explain the logic or elaborate more of this base-case option?	A section on dredge disposal has been included p 9-71	9
119	Implementation	59 (aa)	This will, in turn, mean that remnant tailings on the floor under beached equipment would not be able to be removed.	This is contrary to the Environmental Requirements. If ERA believe this is best outcome for the least environmental impact & risk then a BPT assessment and agreement is needed between all stakeholders. Is ERA undertaking a process by which to obtain this agreement?	See response to comment #117	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
120	Implementation	59 (aa)	The demolition contractor The bulk material movement contractor	This is the first time such contractors are mentioned. Please provide a short description of the competences require in the various contractors who will support ERA during closure including what phase and works each will undertake. This could be in a Section at the beginning of the Implementation Chapter (11.0) describing the EPC/EPCM resources (& perhaps too the financial ones) who shall undertake the works.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
121	Implementation	(61) 11.4.1.8 Process water storage	'At the completion of Pit 3 closure works ... '	A graphic table with timing and sequence would be illustrative. Table 11.8 may be a suitable basis. Perhaps bring it to start of the Section on TSF decommissioning & deconstruction. The 'at the completion of Pit 3 closure works, water will be pumped back to the TSF' raises the question as to what 'completion of closure' is. If it includes final landform then the return of water has to happen prior to the final landform being constructed and therefore prior to completion of closure. End Pit 3 = TSF as process water store Retention Pond 6 as primary process water store towards end of closure. When TSF <1GL water transferred to RP6 TSF deconstructed. RP6 final process water store. Can ERA better explain this process? It is quite confusing and difficult to follow.	This has been updated to clarify. Refer to Section 9.4.3.	9
122	Implementation	61 (11.4.1.9 TSF deconstruction)	The TSF wall material is assumed to be suitable to use as part of the final landform.	Is there a program to confirm this? What is the assumption based on? Is the assumption robust enough?	The TSF wall material was discriminated to confirm it was 1s waste rock prior to use in wall construction.	9
123	Implementation	64 (11.4.3)	Approval for burial of the vessels within the TSF is required and proposed to be obtained as part of the TSF deconstruction approval. If approval is not given, alternate options for removal and disposal will be considered within the BPT framework.	Has ERA performed a high-level risk and strategy assessment in case it isn't approved, particularly concerning risk to overall closure schedule.	This information will be included as part of the TSF deconstruction application.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
124	Implementation	69 (11.5.1.1 Brine Concentrator)	BC capacity is specified via the flow of product distillate. The BC initially has a distillate production capacity of 5.0 ML/d and has been slowly increasing through operational excellence programs. The current BC distillate production is 5.9 ML/day. The water management strategy requires the capacity of the BC to be increased to 6.7 ML/d. The increase in capacity is based on upgrading BC3 by installing a 2.1 MW vapour recompression fan, identical to the current fans of BC1 and BC2. Currently, BC3 is fitted with a 1.2 MW fan. The new fan is to be installed adjacent to the existing fan and tied into the existing vapour ductwork. The block flow diagram for the BC3 fan upgrade is provide in Figure 11-44. The upgrade to BC3 increases recovered water production, which subsequently increases flows throughout most of the existing plant. Several existing items of equipment must be upgraded for these increased flows.	This is specific technical information about the BC. However, it is not clear how it helps assess the implementation of the closure plan. In this Section ERA should be able to state that the BC has the capacity to satisfy the water management strategy and omit the technical details describing how.	The water treatment section has been updated Section 9.4.3	9
125	Implementation	71 (aa)	The first five paragraphs on P71 from "In the second stage ... " ending with " ... the HDS plan on low TDS process water."	See comment on BC above. In the Section on implementation it is doubtful the reader need such technical information. Such technical data on the infrastructure can be placed in an appendix, freeing the body-text to discuss how the infrastructure shall be used during closure implementation and process.	See response to Comment #124	9
126	Implementation	72 (11.5.2.1 Osmofo Brine Squeezer)	General comment on information on Page 11-72	Further to discussion above, this is a good example of the level of information required by the reader to understand ERA has the capacity and technology to deliver their MCP	Noted	
127	Implementation	74 (11.5.3)	General comment on works and plans schedules	Implementation of the MCP will follow well considered steps captured in one or more schedules. The MCP or at least Chap. 11 should have a Section containing these schedules presented both as bullets and as Gantt charts that can be extracted and easily referred to whilst reading the text.	It is difficult to display complex schedule in the MCP. Appendix 9.1 is provided as a summary schedule that can be displayed in the document.	9
128	Implementation	81 (11.6.1.2 Demolition and disposal)	concrete slab and foundations to a depth of 1.5 m below ground level	Can ERA elaborate more on what this means?	This refers to the bunds and other infrastructure in the processing plant area that requires demolition. Details are provided in Section 9.3.5.	9
129	Implementation	82 (aa)	Demolished items must be buried on site at 8 m level deep below final landform	Can ERA provide justification for this solution? As in, why 8m?	This depth has now been refined to 6m. Details have been provided in Section 9.4.3	9
130	Implementation	82 (Table 11.10)	Demolition processes	Table should be at front of Section.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
131	Implementation	84-85 (Tables 11.11 and 11.12)	Phase 1 demolition areas Phase 2 demolition areas	Are the areas listed according to schedule priority or other criteria?	They are listed according to when infrastructure will no longer be required.	9
132	Implementation	86 (11.6.1.2)	Detailed material take-offs	What means 'Detailed material take-offs'?	This has been updated to clarify. Refer to Section 9.3.5.	9
133	Implementation	87 (aa)	The following items have been identified as materials that should not be processed but placed in Pit 3 whole due to the expected level of contamination post decommissioning:	Is there a risk leak & contamination to GW, eventual mechanical degradation leading to voids, or other means for the contaminants to be released and/or the infrastructure impact on final landform and rehabilitation efforts?	The risk from all groundwater sources is currently being modelling and will be included in future updates of the MCP. Details of these studies are provided in Section 5.	5
134	Implementation	87 (aa)	Key assumptions of Phase I (&2)	Key data, information, lists, etc, should be presented at the start of the relevant Section.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
135	Implementation	87 (11.6.1.3 continuity of services)	• essential services are assumed to remain operational, as per the current operating system, until commencement of Phase 1 demolition	What does 'assumed' mean in this context? Which 'essential services' are required until but not after Phase 1 demolition?	For the purposes of engineering and planning on continuity of services the assumption is that operations will not remove some services.	9
136	Implementation	89 (11.7.1 Ranger deeps closure activities)	First paragraph starting 'The Ranger Deeps ... '.	Tabulate. Not particularly relevant for the closure plans and activities	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
137	Implementation	90 (aa)	Paragraph starting ... "ERA has now commenced ... "	This paragraph should start the Section. Heavy use of parenthesis breaks up text and makes understanding what the author wants the reader to know more difficult.	Suggestion noted. Consideration will be given to updating this Section in future submissions.	
138	Implementation	91 (aa)	A reduced level of C&M until 2021 will maintain the water level in the decline at -20 mRL.	Why at -20mRL? What is the long term closure/post-closure outcome? Is this the long term RL for water level? Or what happens after the pumps are turned off?	This is a commitment from the Ranger 3 Deeps decommissioning application approved by the Minister. Further information on this commitment is available in that application.	9
139	Implementation	94 (Figure 11-55)	Perspective of figure	Without the surface included for reference, figure is not informative. Suggest also including a photo with final cutting gradient superimposed.	Suggestion noted. Consideration will be given to updating this figure in future submissions.	
140	Implementation	95 (Table 11-15)	Description of geological terms	There are a lot of different types of schists with varying competence. Please describe what type of schist, eg: biotite-graphitic schist (low competence, easily weathered), quartz-feldspar schist (high competence, resistant to weathering), etc.	The upper section of the R3 Deeps exploration decline is developed within mine sequence hangingwall schists of the upper Cahill formation. There are only two types of schist exposed in the decline walls: 85% are muscovite-quartz-feldspar schists and 15% are interbedded amphibolite schist. The intent of Table 11-15 is not to specifically refer to any particular schist lithology, but to categorise the ground support based on the degree of weathering of schist exposed along the length of the decline prior to shotcreting; from completely weathered to unweathered schist as one descends through the weathering profile. Down to 30 vertical metres below surface, both types of schist are completely weathered, with very low strength. Both rock types rapidly transition into fresh rock of medium strength below that depth.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
141	Implementation	96 (Figure 11-57)	Interpretation of figure	The figure is not easy to interpret. Is there a way to guide the reader in interpreting this figure?	This is a technical figure that is required to be included to demonstrate potential failure of the underground workings. An attempt has been made to explain this as best as possible.	9
142	Implementation	97 (11.7.1.5)	The only way to 100% guarantee the long-term stability of the shaft is to completely backfill it and the rill area at the base of the shaft.	Is this a requirement of closure of the shaft?	No this is not a requirement.	9
143	Implementation	98 (11.7.1.6 Hydro conditions)	The results also suggest that the long-term impact of depressurisation from excavation and dewatering of the exploration decline and shaft on the local groundwater system and Magela Creek will be negligible	This and other assessments of impacts could be in a dedicated Section.	Suggestion noted. Consideration will be given to updating this figure in future submissions.	
144	Implementation	100 (11.8 Stockpiles)	This will enable revegetation works to be completed by the completion of closure milestone (8 January 2026).	It is unlikely revegetation works will be completed by Jan 2026.	ERA is committed to complete initial planting of all revegetation areas by 8 January 2026. However, it does not include the infill planting that will be implemented post 2026.	9
145	Implementation	105 (Table 11-16 & 11-17)	Dates of movements	Is it possible to put provisional dates with the final landform dozing activities?	See response to comment #127	9
146	Implementation	106 (Table 11-18)	Ore grades and material type	This information would be good to have when first mentioned in the text and/or in a Section dedicated to ore-grades and material types to which the reader is referred.	Suggestion noted. Consideration will be given to updating this figure in future submissions.	
147	Implementation	108 (11.8)	All the material in the current TSF walls is assumed to high 1s or low 1s	'assumed (to) be'. Is ERA investigating the TSF walls to ensure it is 1s material?	See response to comment # 122	9
148	Implementation	111 (11.9.1.1 Pond water storage)	'When possible the total inventory of RP6 will be transferred to RP2'	This suggests an uncertainty, that it may not be possible. Can ERA provide reassurance that it will be possible and perhaps the likely conditions defining 'when possible'?	This has been updated to clarify. Refer to Section 9.4.3.	9
149	Implementation	112 (11.9.1.1. Retention Pond 2)	Once all the pond water has been treated on site RP2 will be prepared to receive waste	What happens to the pond water after RP2 is closed ? Released? Likely time for this?	RP2 will be decommissioned once all the pond water has been treated.	9
150	Implementation	114 (11.10 Waste and Hazardous material)	ERA has identified that the following hazardous wastes ...	It appears some on the list are not hazardous.	This has been updated. Refer to Section 9.4.2.	9
151	Implementation	116 (11.11.1 Closure activities)	Removal of infrastructure and scarifying ... has been successful ... for (rehabilitation of linear infrastructure) ... and requires neither direct seeding nor planting to achieve acceptable outcomes	Linear infrastructure can remain visible for a long time, eg: drill lines, seismic lines, soil-sampling, old roads and tracks. Is this likely on the RPA if no specific rehabilitation program is planned? Has this approach been OK'd by stakeholders, particularly GAC?	Approval of the closure plan for linear infrastructure is via this MCP. Any concerns from stakeholders on the plan will be received as comments to the MCP and responded to in future versions of the MCP. To date no issues have been noted.	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
152	Implementation	121 (Figure 11-67 & 11-21)	Correlation between the figure and table	Is it possible to correlate the figure and the table? They are complementary.	Suggestion noted. Consideration will be given to updating this figure in future submissions.	
153	Implementation	122 (Table 11-21)	Further work	A lot of further work is described in the table. Will it be completed in time to ensure appropriate management of the areas?	All work forms part of the overall closure schedule and can be completed in the required time.	9
154	Implementation	124 (11.15.1.1 Contaminated land and plume management)	During the feasibility study a Plume and contaminated site management plan was developed.	Is there a target for when this information will be available for inclusion in a future version of the MCP?	Further information has been included in Section 9 and 5 this year. It is expected that this work will be completed in the next 12 months to be included in the 2021 MCP.	9
155	Implementation	127 (11.16.2 Surface layer)	... the community types that best suit particular environmental conditions of the Ranger Mine final landform can be identified (Humphrey et al 2009)	After 10 years since Humphrey et al researched the area, are the community type best suited to Ranger identified?	It was a statement of the general approach "By understanding the environmental features that are associated with the normal range of native vegetation community types, the conditions required to support these communities and/or the community types that best suit particular environmental conditions of the Ranger Mine final landform can be identified (Humphrey et al. 2009)". 2020 MCP has extensively discussed the development of conceptual reference ecosystems (Ch5 Appendix 5.1).	5
156	Implementation	128 (aa)	The soils in the Georgetown Creek Reference Area vary in their drainage status and are typically gravelly and less than one metre deep to parent rock. Key geomorphic features (including parent material ...	What is 'parent rock' and what type of 'parent rock' is referred to here?	Parent rock refers to underlying weathered Cahill Formation's Hanging Wall Sequence. The Cahill Formation Hanging Wall Sequence consists of schists composed of muscovite, biotite, quartz, hematite, garnet and/or magnetite. It is intersected by numerous thin quartz and amphibolite intrusion, and by a single, thick (20 to 30m) amphibolite sill near its base, INTERA (2019).	5
157	Implementation	128 (aa)	Given the variation in PSD of the TLF (as discussed in above),	Spell out acronyms – what is PSD? How far 'above'? In this Section, chapter, document? It is not clear.	PSD = Particle Size Distribution. Abbreviations have been included at the front of each section	9
158	Implementation	128 (aa)	The environmental characteristics that influence variation in plant communities, as discussed above, are likely to also vary across the Pit 1 final landform cover and result in the heterogeneous combination of vegetation communities observed in the Ranger Mine reference sites.	The waste rock which forms final landforms is likely to be a heterogeneous mix of all geology types, unweathered. Whereas in the reference area the in situ geology exists and has been there for potentially millions of years, influencing soil geochemistry and thereby plant ecosystems. Can ERA confirm this conclusion?	This work forms part of the constraints and revegetation domains planning to be conducted in the next 12 months.	9
159	Implementation	130 (11.16.5 Surface layer construction)	Non-compliances are easily discovered by survey during backfilling	'easily' is a relative term and should be removed.	This has been updated. Refer to Section 9.4.5.2	9



A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
160	Implementation	130 (11.16.6 Erosion controls)	a range of annual exceedance probability (AEPs) from the 1EY (one exceedance per year) event to the probable maximum flood (PMF),	Retain full spelling of such acronyms. An explanation (in a text box) would also be useful.	A table of abbreviation and acronyms has been included at the front of each section. Text box suggestion noted. Consideration will be given to updating this figure in future submissions.	9
161	Implementation	132 (aa)	The changes to the final landform design surface to address concerns in key areas were incorporated into the final landform surface DEM Version FLV6.2	Whilst it's understandable why the author wants to emphasise that a 'concern' has been addressed it does not inform the reader of the context of the concern. If necessary to highlight a concern has been addressed info-text box could be use. Recommend not mentioning it at all.	This has been updated. Refer to Section 9.4.5.	9
162	Implementation	132 (aa)	Last three paragraphs starting with "Each version of the ... " and ending with "... for the landform of 10 000 years are extremely low."	Text-box such supplementary information. It does not inform the reader of the closure plan. It supports why a certain closure activity has been selected (robustness and QCQA) and that work is ongoing (will be presented in subsequent MCP). But doesn't say what's actually going to happen. Large volumes of such text are throughout the MCP which makes it long and hard to read.	Noted	
163	Implementation	135 (aa)	Measures to limit erosion and sediment discharge on the general surface of the landform are arguably the most critical	By whom is it 'arguably'? Perhaps remove	This has been removed.	9
164	Implementation	135 (aa)	advice received (from) the Northern Land Council and the Gundjeihmi Aboriginal Corporation have indicated that ripping of the landform may impact traversibility, so it should be minimised wherever possible.	Has an agreement been reached with TOs regarding this approach?	Discussions on ripping are currently being discussed as part of Pit 1 planning, with trails to be completed.	9
165	Implementation	140 (Figure 11-76)	Flow direction	Flow direction indicator would be handy	Suggestion noted. Consideration will be given to updating this figure in future submissions.	
166	Implementation	141 (11.17.2 Provision of seeds)	ERA has been working extensively with Kakadu Native Plants Pty Ltd, a locally owned and run indigenous supplier, to provide seedlings for much of the revegetation projects that have occurred both at Ranger Mine and Jabiluka over the past 15 years. This supplier has extensive expertise in local plants including seed biology, propagation, revegetation and weed and fire management.	Perhaps "ERA has been working with a locally owned supplier with extensive local experience." Focus should be on closure, what's important to inform the reader that ERA has a viable plan and what it includes. The reader doesn't need to know about Kakadu Native Plants. The other organisations mentioned in the document do not have this kind of explanation. A list of supporting companies and organisations and their suitability and function can be placed in an appendix.	Noted	



ERA

A.4 DITT feedback on 2019 MCP

Comment #	MCP Overarching Section	MCP reference	MCP theme	DITT Comment/Question/Recommendation	ERA Response	MCP Section 2020
167		142 (11.17.3.1 Irrigation)	(potentially requiring mechanical equipment)	The mention of workers then the possibility of needing mechanical equipment suggests there's a rationale behind it. Why wouldn't ERA use mechanical equipment?	This has been updated. Refer to Section 9.4.6.	9
168		146 (11.17.7.1 Tubestock)	ensure tubestock production capacity of between 500,000 and 700,000 stems per annum	That's 1400 to nearly 2000 per day. Is the nursery capable of producing this number of viable tubestock? Does ERA have a viable contingency in case it is not possible?	The text in question describes the physical carrying capacity of the Ranger nursery, it does not necessarily represent the actual number of tubestocks required. ERA does have a viable contingency plan. ERA has approached nurseries in Darwin and seeds of required species will be free issued to engaged nursery to raise plants to fill the gaps in case the demand is over the capacity of the Ranger nursery or other emergency.	9