

27 September 2023

Department of Industry, Tourism and Trade (DITT)
Northern Territory Government of Australia
GPO Box 4550
Darwin NT 0801

Attention: **Paul Jones**
Health, Safety and Environment Director, Rum Jungle Rehabilitation

Dear Paul

Preliminary Remediation Action Plan (PRAP) for Rum Jungle Stage 3 Early Works – Independent Peer Review

Our initial review comments (issued on 22 September 2023) on Revision 0.4 of the PRAP (dated 14 September 2023) were compiled in consideration of the required scope of work:

- “the peer reviewer shall issue recommendations regarding the draft RAP”; and
- “the peer reviewer shall prepare written advice to DITT regarding the final Early Works RAP” which must “state that Conditions 10-3(1-3) of the NT EPA Environmental Approval have been achieved”.

Subsequently, Revision 0.5 of the PRAP was issued and reviewed by the Auditor, after which the Auditor provided his endorsement of the PRAP in compliance with Condition 9-2(3) of the NT EPA Environmental Approval.

This correspondence has been provided to confirm, as per Condition 9-2(4) of the NT EPA Environmental Approval, that the PRAP has been “revised to address any comments of the independent peer review.”

As such (as per Conditions 10-3(1-3) of the NT EPA Environmental Approval) the peer reviewer can certify that the Site Auditor endorsed PRAP (Revision 1.0 dated 27 September 2023) is:

- suitable for the scope of remediation for the proposed action;
- is technically sound, based on appropriate data, and supported by the conclusions of investigations and studies presented in the Environmental Impact Statement (EIS); and
- is consistent with best practice standards in line with the National Remediation Framework (NRF).



If you have any queries regarding this correspondence, or require further information, please contact the undersigned on (07) 3852 6666.

On behalf of
Environmental Earth Sciences QLD



Peer Reviewer (Senior Principal)
Mark Stuckey



723035 Lt03_V01_PRAP

723035 Lt02_V01_PRAP – SLR Response

Date:	26 September 2023
Document Title:	Preliminary Remediation Action Plan – Stage 3 Early Works – Rum Jungle Mine Site
SLR Report Ref (reviewed):	680.30185.00000-R01-v0.4-20230914
SLR Report Ref (revised):	680.30185.00000-R01-v1.0-20230926
Auditor Review Letter Ref:	723035 Lt02_V01_PRAP
Audited By:	Mark Stuckey and Philip Mulvey – Environmental Earth Sciences

Item No.	SLR Response
Major Items	
1	No longer relevant as installation of SIS boreholes removed from the scope of early works that the PRAP applies to.
2	As the installation of SIS boreholes has been removed from the early works that the PRAP applies to, dust controls are now limited to the management of general construction dust / nuisance dust predominantly associated with handling of imported fill/construction material. As discussed during meeting on 25 September, development of an emission monitoring plan no longer considered necessary.
3	Section 10.3 updated to reference the IECA BPESC as the ESC standard that will be adopted for the early works.
Minor Issues	
4	Noted - text amended removed mention of "endorsed".
5	Text in section 2.0 amended
6	Unsure why some of the figures were not legible. Will send through as separate files. Note that Figure 5 has been removed due to removal of borehole installation from scope. The approximate location and extent of the culvert crossing work area is indicated on Figure 3. Main WRD levee has been labelled on Figure 3. Acknowledge that there are other features included in Table 1 that have not been identified in Figure 3 - subsequent RAP will include complete site map with all features labelled.
7	Noted – will incorporate into CSM included in the subsequent RAP.
8	Noted – as discussed, subsequent RAP document will include CSM diagram(s)/figure(s).
9	Noted. As the installation of SIS boreholes has been removed from the early works that the PRAP applies to, detail on the AMD characteristics will be provided in the subsequent RAP (assuming installation of SIS boreholes will be included in next RAP).
10	Text in Section 10.3 has been amended to include statement about basic ESC principle.
11	Text in Section 10.4 reduced, given installation of SIS boreholes has been removed from scope
12	No longer relevant as installation of SIS boreholes removed from the scope
13	No longer relevant as installation of SIS boreholes removed from the scope
14	No longer relevant as installation of SIS boreholes removed from the scope

22 September 2023

Department of Industry, Tourism and Trade (DITT)
Northern Territory Government of Australia
GPO Box 4550
Darwin NT 0801

Attention: **Paul Jones**
Health, Safety and Environment Director, Rum Jungle Rehabilitation

Dear Paul

RE: Preliminary Remediation Action Plan (PRAP) for Rum Jungle Stage 3 Early Works

Thank you for providing the above report for review. Please find below our initial review comments on the report, which have been compiled in consideration of the required scope of work, being that:

- “the peer reviewer shall issue recommendations regarding the draft RAP”; and
- “the peer reviewer shall prepare written advice to DITT regarding the final Early Works RAP” which must “state that Conditions 10-3 (1-3) of the NT EPA Environmental Approval have been achieved”.

Note that the comments are split into Major and Minor Items. Major items require correction or implementation. Minor items are not essential and include: i) minor non-compliance issues with guidelines, ii) grammatical errors and / or iii) confusing presentation but do not impact the outcome of the peer review. This review does not indicate acceptance or endorsement of the report.

Major and minor items are set out below:

Major Items

1. Technical Specifications – Borehole Drilling

Appendix A Section 5.6 second paragraph and **Section 5.3** last paragraph implies all drilling fluids and aquifer testing water will be collected for safe disposal, as does **Section 10.3.2** of the main body of the PRAP, which states that “no active discharge of water will be carried out”. This is at variance with **Section 10.2.1** which states that water generated will be allowed to seep into the soil profile.

The purpose of drilling the holes is to set up an extraction system for contaminated groundwater. Thus, the groundwater is expected to be contaminated i.e., of low pH and therefore containing at least dissolved copper, iron and aluminium and potentially uranium and if the pH is below 4.5, thorium.

Sumps should therefore be lined with an Ag Lime and crushed limestone (>5mm) mix, whilst near continuous testing of groundwater will be required. Further, if the pH drops below 4.5 and/or the TDS rises from the discharge pump, testing of the sump should

commence. Disposal of sump sludge should occur according to site practices dependent on the final test results of sump flocculant. Flow rate is expected to be a maximum of 2 L/sec so each hole will need an appropriately sized sump. Additional work is required to have a system to address the acid and metal contamination to soil and the potential radiological risk from thorium (which is soluble at pH <4.5). The text and **Appendix A** must align in this regard.

Appendix A Section 5.4 – bore construction details only have a 0.5 m bentonite layer. This is insufficient for direct circulation drilling and may not impede macro porosity due to drilling technique. If a distinct aquifer zone is being targeted, then a 2 metre bentonite layer is required above the annulus sands of the slotted zone prior to backfilling with cuttings or clean sand.

2. Requirement for daily emission monitoring and preparation of an emission monitoring report

An emission monitoring plan should be compiled and include daily site walks with record of visible dust, disturbed vegetation areas, and sediment and erosion, as well as a requirement for contingency responses, e.g., visible dust, pH below 4.5 of drilling fluids etc. Constant monitoring of groundwater during drilling and monitoring of dust are a requirement of the document but there is no requirement to fill out daily form with which a template has been provided or what is the standard and the contingency.

It is stated in the last paragraph in **Section 10.4** that the DITT project team will regularly supervise the drilling contractor to ensure the (site safety and environmental) controls are in place during early works period. Exactly what these controls are and the nature of supervision to what standard is not set out. Templates of daily compliance are also not provided in the Appendices.

Similarly, a signoff template for equipment decontamination leaving site is also not provided.

3. **Section 10.3:** Erosion and sediment control is required for all civil works, including the planned culvert works. The standard to be met for the submission to the DITT control team has not been stated. If not in condition 9-4(3) and subsequently condition 16, it should be at least to a well-used standard such as The Blue Book used widely as a reference document in the Eastern States.

Minor Issues

4. Neither the auditor or the peer reviewer endorse relevant documents (Table 2) we merely confirm or certify compliance with guidelines and in the absence of guidelines industry best practice.
5. It was known at the time that the 1984-1988 works were likely to fail (and had failed) due to an absence of a capillary break in the cover design. Therefore, on page 4 consider the following wording: "These rehabilitation works were considered successful at the time."
6. The figures are poor in communicating locations of works and site features. **Figure 3** should delineate areas in which site works for the PRAP will be undertaken. This could include separate rectangles for the separate well fields for East MWRD, West MWRD, IWRD, OCEA, OSA as well as delineation as to where the bridge/ culvert works would be undertaken. **Figure 5** is not legible. Some site features discussed in the text are not shown in any figure, such as the main MWRD levee. Please ensure all features discussed in the text are shown in figures.

7. **Table 1:** One of the significant previous failures was the absence of a capillarity break between the waste and the covers. **Table 1** does not show this as an impact on ecological vectors.
8. The site conceptual model both geophysical and source-pathway-receptor analysis is not presented diagrammatically as a figure or series of figures.
9. The AMD characteristics of Rum Jungle are not defined, merely assumed. AMD is a broad term and can vary from metalliferous rich neutral pH to very acid nonmetalliferous leachate. Thus, for Rum Jungle it is likely to be low pH, with acidity due to dissolved iron and aluminium as well as H⁺ and containing soluble copper other metals and with a slight risk from uranyl, and when the pH is below 4.5, thorium. Please summarise what is the known and likely AMD risk expected for the groundwater. This is needed to understand impact of drilling fluids and disposal, as well as WHS aspects on the program.
10. The erosion and sediment control plan does not state that the basic principle will be to minimise disturb areas and to maintain vegetative cover wherever possible.
11. Current safety controls for the protection of works from dust and radiation hazards (see **Section 10.4**) should be an appendix.
12. In reference to **Appendix A**, as the drilling method is direct circulation, near constant monitoring during drilling of EC, Temp, pH, flow and description is required to pick up inflow zones and for environmental and safety responses. An increase in flow rate should allow for drilling a further one metre once the increase has stabilised and undertake a 15-minute airlift test, recording the stabilised flow rate and if possible, the recovery (if a tremie line is used).
13. At the end of development if possible, a multi-rate step down test should be performed to assist in specifying the pump and long-term operating extraction rate.
14. As stated in the major items, there is no discussion on what happens with sump solids and drummed water at the end of the program.

Conclusion

Once the above issues have been satisfactorily addressed, the peer reviewer will be able to certify that the PRAP is:

- suitable for the scope of remediation for the proposed action;
- is technically sound, based on appropriate data, and supported by the conclusions of investigations and studies presented in the EIS;
- and is consistent with best practice standards in line with the National Remediation Framework (NRF).

If you have any queries, or require further information please contact us on (07) 3852 6666.

On behalf of
Environmental Earth Sciences QLD

Senior Auditor/ Hydrogeologist
Philip Mulvey

**Internal Reviewer/ Senior Auditor/
Hydrogeologist**
Mark Stuckey

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