

30 July 2024

2015-08-M-Rev0

TO:

Dr Ros Green
Principal Environmental Geochemist
Rio Tinto Pty Ltd
Rosalind.Green@riotinto.com

FROM:

Dr Cherie McCullough
Director, Principal Environmental Scientist
Mine Lakes Consulting Pty Ltd
PO Box 144, Joondalup DC
WA 6919
AUSTRALIA
cmccullough@minelakes.com

Rio Tinto, Winu Mine – Review of water balance and quality modelling by Hydrogeologica.

1 SUMMARY

Mine Lakes Consulting (MLC) undertook a review of Hydrogeologica (HGL) modelling to date in terms of fitness-for-purpose of informing the environmental risk assessment (ERA) MLC had undertaken concurrently.

The review compared modelling approaches to state, national and international guidance or modelling as jurisdictional and non-governmental organisation guidelines, and from published and peer-reviewed pit lake literature including leading practice case studies and scientific papers.

Overall, the HGL draft modelling was found to be satisfactory and fit for purpose. However, there are some important considerations recommended before modelling outcomes were finalised. In particular, there was no indication of leading or even current pit lake modelling practice and how the modelling study demonstrates it meets these. Another issue was the risk assessment the study pertained to undertake. Conceptual modelling was also not specific to WPA and there was some concern about modelling abandonment bunds as long-term levee structures when they were not designed for this.

HGL responded with clarification and amendments to the feedback received through Rio Tinto. The responses permitted a more refined modelling approach and outcome in the final report that better met the needs of the ERA. However, two key issues remained.

1. Although final review recommended that nitrogen not be modelled or their data used, long-term nitrate concentration predictions were presented. However, biogenic studies had not been accounted for in modelling and these data were, therefore, extremely conservative for nitrogen species. We recommend that nitrogen results not be used as they are likely highly conservative.

2. Further COPC screening against groundwater water also not recommended for interpretation of environmental risk. We recommend that groundwater screening comparisons to long-term pit lake water predictions are disregarded and instead that the ecological ERA is relied upon for water quality risk judgements.

Nevertheless, given that current mine closure planning for WPA is early and still conceptual in nature with identified requirements for permitting, determining preliminary closure objectives and potential next land use(s) and closure cost provisioning, the final study was found to be fit-for-purpose.

We recommend future modelling consider leading practice at the time at all jurisdictional levels, including likely changes in legislation and guidance relevant to WPA. We also recommend that model constants be informed by case studies, trials and other scientific research applied to WPA. Nutrients should not be modelled unless there is explicit concern regarding either nitrogenous species toxicity e.g., NO₃, or eutrophication. Proposals to use abandonment bunds as levees should ensure that design criteria are adequate for that purpose and detailed in associated closure planning documentation e.g., the WPA MCP. Finally, the pit lake knowledgebase should be grown especially with regards to more reliable local climate and geological data as ancillary studies provide opportunities.

Why choose Mine Lakes Consulting?

Mine Lakes Consulting are a highly experienced and internationally active environmental consultancy specialising in mine closure, and particularly mine water and the environment. We have an excellent understanding of pit lake closure and compliance guidance, having developed much of this under contract to regulators and through advising pit lake closures through to relinquishment. Our scientific work has underpinned the global understanding of leading practice pit lake closure and environmental management.

Closing

Thank you for this opportunity to provide professional services to you and your organisation. If you have any questions regarding this document, please feel free to contact the undersigned.

Authorisation



Dr Cherie D. McCullough, PhD

Director, Principal Environmental Scientist

Mine Lakes Consulting Pty Ltd

BSc, MSc (Hons), PhD, FAusIMM CP(Env), OMCPPA

MINE LAKES CONSULTING PTY LTD

ABN 42 679 172 411