

Supplementary Expert Witness Statement of Tony McAlister

In the matter of the Fingerboards Mineral
Sand Project EES – Water Quality and
Centrifuge Considerations

Kalbar Operations Pty Ltd

February 2021





1 INTRODUCTION

I, Tony McAlister, was engaged by Kalbar Operations Pty Ltd (Kalbar) to provide expert evidence in respect to water resources and water quality for the proposed Fingerboards Mineral Sands Mine. I have provided an Expert Witness Statement on these matters based on work undertaken by myself and under my supervision for the EES.

This Supplementary Expert Witness Statement addresses the implications on my earlier advice and professional opinion of the intention of Kalbar to now include centrifuges in their site operations.



2 OVERALL TAILINGS CENTRIFUGE CONSIDERATIONS

Since preparation of the EES, Kalbar has decided to include centrifuges as a component of their project operations. I have been provided with a technical note dated 18/1/2021 detailing the rationale behind, and method of, implementation of centrifuges for water recovery and tailings management. I am supportive of the decision to include centrifuges from the perspective of reducing any potential for water quality impacts on the Mitchell and Perry Rivers and Gippsland Lakes associated with the project.

My comments/justifications for this support are outlined below:

- With the adoption of the centrifuges, there will no longer be a need for fine tailings storage facilities. This will significantly reduce the overall degree of site works at any one time associated with the project;
- Mine site operation with the adoption of centrifuges will see the mine voids effectively continuously backfilled, meaning that the disturbed mining area at any one time will be far smaller, and rehabilitation works can occur much sooner after mining works are completed in any particular portion of the site;
- The residual water/centrate resulting from the operation of the centrifuge will be able to be readily redirected for use elsewhere within site operations;
- With the smaller site disturbance footprint and the highly controlled nature and quality of the centrate, the overall water quality management regime within the site will be easier to control, test and operate; and
- Any potential 'secondary' local or regional water resource or water quality impacts associated with changes to the local groundwater regime will also reduce significantly as there will be far less potential interaction between the water that would have been present within the fine tailings storage facilities for months at a time and the local groundwater table.

The only comment or caveat that I place in regard to the above opinion relates to the use of additional flocculant within site operations to enhance operation and performance of the centrifuges. This may change the pH of the centrate and/or introduce other sources or compounds of potential concern into the centrate (e.g., dissolved aluminium), depending upon the flocculant used. These concerns are highlighted as they are, with careful consideration (see more discussion on this below), readily manageable, especially so given the localised and controlled manner by which the centrate will be produced. Further investigations by the proponent to clarify and address these matters to my satisfaction are recommended. I have already provided commentary in regard to the general use of flocculants on site in my earlier Expert Witness Statement.

To provide further context in regard to the use of flocculants on the site, I note as follows:

- An adaptive/automatic management strategy can be implemented within the Kalbar site operations in the unlikely event that the regular site water quality monitoring works that are proposed detect unacceptable pH levels in site waters. This could, for example, include the addition of real time inline pH measurements on the centrate stream from the centrifuge plant. This would then ensure that the pH is corrected with the addition of lime, if and when such an event occurs. Such systems are automatic and do not require direct human monitoring to detect pH variances and are widely used in applications of this nature worldwide.
- Flocculants are widely used all around the world for water and wastewater treatment, sediment and erosion control and a range of other applications. They are not 'new' and there is significant knowledge and expertise available to ensure that they are applied in a safe, logical and appropriate manner.



3 SPECIFIC COMMENTARY ON MY PREVIOUS EXPERT WITNESS STATEMENT

The following section provides specific additional commentary in relation to comments provided in my earlier Expert Witness Statement regarding how and where the centrifuge inclusion will have an effect.

3.1 Responses to Submissions with Substantial Content

3.1.1 Submission #291 – Southern Rural Water

- Regarding the concern with respect to water management dams, and the potential impacts on water quality and the environment due to dam failure, I noted in my earlier Expert Witness Statement that with careful design and operation, the probability of such failure is extremely low. This is further supported by the low rainfall environment at the site which will result in there being relatively low volumes of water being dealt with at most times.

I note that with the implementation of centrifuges, the water management regime at the site will be far simpler, and there will be no tailings dams – and hence no risk of failure of such tailings dams.

3.1.2 Submission #358 – West Gippsland Catchment Management Authority (WGCMA)

- Regarding the potential for site operations to have impacts, specifically via changes in flow or water quality in the downstream ‘chain of ponds’ features, in my opinion the combination of the site having a very low rainfall environment, there being a robust site water management regime in place (including flow diversions, water source separation, water reuse, and as required water treatment), and the intention to implement a robust monitoring and adaptive management program will, in combination result in low to negligible potential for the impacts raised by WGCMA.

This opinion is even further justified with the proposed use of centrifuges and the fact that tailings storage facilities will no longer be required, which could otherwise have had an influence on the part of the site that drains to the Perry River.

3.1.3 Submission #514 – EPA Victoria

- The EPA had requested more detail on the frequency, timing and volume of discharges to the Mitchell River. I note that with the inclusion of centrifuges in the site works, the currently assessed flows and loads from the site provided to Water Technology by EMM will change (noting - for the positive benefit of the receiving environment). As a condition of approval of the project, I believe that EMM/Water Technology should recast the predictions presented in the EES based on the new site water management regime with the inclusion of centrifuges and provide a new suite of water resource and water quality modelling and more specific discharge quantity and quality data to the EPA. I also note that mineral extraction works should not be allowed to commence on site until the EPA accepts these new assessments and data.

3.1.4 Submission #692 – East Gippsland Region Water Corporation (East Gippsland Water)

- Regarding potential contaminants associated with site operations, I note that the water quality modelling assessments undertaken by Water Technology for the range of potential contaminants expected to occur in site run-off show no adverse impacts on water quality in the Mitchell River. These assessments are in fact (now) highly conservative, as they have taken no consideration of the modified water management



regime on the site that will be associated with the proposed inclusion of centrifuges and the removal of tailings dams.

- Regarding tailings dams, I also note that with the proposed inclusion of centrifuges in site operations, there will no longer be a need for fine tailings dams as a component of site operations.

3.1.5 Submission #716B – East Gippsland Shire Council

- Council's submission suggests that an assessment of mine water run-off which considers salinity, pH, and radionuclides is warranted. I note, with the inclusion of centrifuges in site operations, that any major evaporative processes on site, especially related to the water being in the tailings storage facilities for potentially several months (which could cause some degree of salt accumulation), will no longer occur. This will further reduce the potential for any impacts to the receiving environment.

3.2 Responses to Submissions with Recurring General Content

Please refer to Table 3-2 in my earlier Expert Witness Statement for the section and issue references included below.

3.2.1 Water Catchment

3.2.1.1 Section 2.4, Issue 1

Issue Description

Pollution, contaminated run off and discharges from the mine and associated infrastructure will affect water quality in the Mitchell and Perry rivers, and other downstream water resources, in particular the Gippsland Lakes.

Specific issues raised include:

- *Gullies and sandy soils present risk of toxic contaminants entering groundwater and spreading to river systems;*
- *Effect of sediments being discharged into the Mitchell River;*
- *Concern that contamination from the mine will negatively affect fishing and migratory birds;*
- *Concern about proximity of project to the Mitchell River;*
- *Haul road and container loading facility were not considered a source of pollution in the EES;*
- *Fresh water from the Mitchell River will increase salinity levels in downstream waterways to dangerous levels. Reduction in environmental flows would be contrary to Australian National Audit Office advice; and*
- *Erosion and runoff will result in loss of soil nutrients.*

Response

I note that the opinions presented in my earlier statement were derived from impact assessments conducted for the mine site **without** the proposed inclusion of centrifuges to assist in the management of fine tailings from mine site operations. With this modification to proposed works on the site, there will be even less potential for impacts than those assessed by the EES.



3.2.1.1 Section 2.4, issue 9

Issue Description

Comment that more information is required in EPA works approval application in relation to proposed water discharges. Submission also makes recommendations in relation to water quality compliance criteria.

Response

Modelling conducted under my supervision showed that the discharge data provided to Water Technology which resulted from the EMM site water balance modelling, which takes into consideration all water discharges, had no adverse downstream impacts in the Mitchell River. I note that with the inclusion of centrifuges in the site works, the currently assessed flows and loads from the site provided to Water Technology by EMM will, in all probability, change as there is no longer a requirement for fine tailings dams.

Hence, I believe that EMM/Water Technology should recast our predictions based on the new site water management regime due to the inclusion of centrifuges, and provide a new suite of water resource and water quality impact modelling and discharge quantity and quality data that can inform the detailed design and preparation of management and response plans.

3.2.2 Water Supply

3.2.2.1 Section 2.5, issue 1

Issue Description

Demand for up to 3GL of water will compete with agricultural uses and prevent expansion of agricultural industries, which some submissions emphasise is a particular problem in drought-prone country. This includes issues relating to the following:

- *Comment that water used for agriculture would give a better economic return than water used for mining purposes; view that use of water for dust suppression is not a good use of a scarce resource; and*
- *Perception that mining operators will enjoy priority access to water. This will also affect flows in the Mitchell River and downstream water quality at Gippsland Lakes.*

Response

I note that all evaluations conducted for the EES did not take consideration of the proposal to include centrifuges within site operations. I have commented previously in this statement about the potential benefits of the inclusion of centrifuges, and on my recommendations for the water balance and modelling to be updated to inform the detailed design and preparation of management plans and mitigation measures.

3.2.2.2 Section 2.5, issue 2

Issue Description

Concern over the quantity of water required for the project: Including issues relating to:

- *Increase in production that will lead to further volumes of water being sought.*
- *Concern the Project will require more than 3GL water per annum, particularly given study undertaken by Oresome Australia Pty Ltd which indicated a water requirement of 4.6-6.2GL per annum.*
- *Concern the Project will be unable to operate safely without the required amount of water, particularly if insufficient water is available for dust suppression; water balance only allows for dust suppression on haul road – not at mining face or on stockpiles (#484)*



- *General concerns about insufficient water supply if the project goes ahead, particularly in light of recent droughts.*

Response

See my previous comments regarding the potential use and benefits of a centrifuge.

3.2.2.3 Section 2.5, issue 3

Issue Description

Impact to other users of the water required, including:

- *Unpredictability of effects of water extraction on other users and the environment due to climate change.*
- *Climate change not adequately represented in surface water modelling completed for project. Comment that water is increasingly valuable as climate change impacts and rainfall becomes more unpredictable. Is mining the best use of this resource?*
- *Concern Project will impact the supply of water for domestic use and /or result in existing users being put on permanent water restrictions.*
- *Availability of water to the South Pines Golf Club.*
- *Increase bushfire risk.*
- *Reduce the amount of water available for growing food and protecting the bush.*

Response

See my previous comments regarding the potential use and benefits of a centrifuge.

3.2.2.4 Section 2.5, issue 5

Issue Description

Concern that the water availability is unobtainable or will be at certain times, responses have included:

- *Queries why Kalbar will be able to access water from the Mitchell River during drought*
- *Suggestions that the intention is to extract water throughout the year.*
- *Australian government bioregional assessments demonstrate that 1,400ML/day flows will not occur for 227 days in a given year.*
- *Extraction sites are not within the tenement boundary.*
- *The river in the area cannot supply anywhere near the volumes of water required for the Project.*
- *Kalbar has not completed adequate assessment of the impacts of extracting 3 GLpa from the Mitchell River (as required by Section 40 of the Water Act 1989).*
- *Kalbar has misrepresented the 'un-used extraction volume' available from the Mitchell River. The RMCG report "...states that there is 6,000 megalitres of irrigation water that has not yet been allocated from the Mitchell River but does not say that it is not yet available." (#530)*
- *What is the back up or alternative strategy if water becomes unavailable?*



Response

My earlier Expert Witness Statement highlighted the fact that Kalbar's proposed water extraction will be less than 0.02% of the water resource available within the Mitchell River. The potential benefits of using a centrifuge within site operations are that there will be even less potential demand to extract water from the system.

3.2.3 Horticulture/agriculture

3.2.3.1 Section 2.12, issue 1

Issue Description

Concern that the Project will affect food production within the horticultural area of the Lindenow Valley, and on broader agriculture within the area. Concern that the land uses cannot co-exist, particularly due to contaminated dust emissions and pollution of water, and relating to what will be the consequences if proposed mitigation measures do not succeed.

Response

I note that my opinions presented in my earlier Expert Witness Statement were derived from impact assessments conducted for the mine site **without** the inclusion of centrifuges to assist in the management of fine tailings from mine site operations. With this modification to opposed works on the site, there will be even less potential for impacts than those assessed by the EES.

3.2.4 Human health

3.2.4.1 Section 2.15, issue 8

Issue Description

Concern regarding potential contamination of water supply that is used for human consumption.

I note that my opinions presented in my earlier Expert Witness Statement were derived from impact assessments conducted for the mine site **without** the inclusion of centrifuges to assist in the management of fine tailings from mine site operations. With this modification to opposed works on the site, there will be even less potential for impacts than those assessed by the EES.



4 CONCLUDING REMARKS

The work conducted under my supervision for this project has drawn on extensive background data sets and has used contemporary analysis and modelling tools to support the evaluation of impacts on surface water resources and water quality.

These works have consistently shown minimal/negligible potential for water resources and water quality impacts associated with the proposed Fingerboards mineral sands project.

In the course of preparing this statement and also based on the recent proposal by Kalbar Operations Pty Ltd to include centrifuges within the project configuration, I have even further confidence of the above minimal/negligible impact conclusion.

To further quantify or justify this (especially given the change in site water management regime due to centrifuge inclusion), and to address some residual issues raised by submitters, I recommend the following further work to inform detailed design and the preparation of appropriate management and mitigation plans:

- EMM/Water Technology should recast our predictions based on the new site water management regime with the inclusion of centrifuges and provide a new suite of water resource and water quality impact modelling and more specific discharge quantity and quality data and updated assessments on the change to the flow regime in the Mitchell River. Such investigations should specifically address in more detail drought conditions; and
- A robust surface water and groundwater quantity and quality monitoring program should be developed and submitted to the EPA for approval. Such a program will provide quantitative data to guide and inform operation of the site water management system, and importantly will trigger any corrective actions that may be required, should the monitoring program indicate any adverse impacts.

5 DECLARATION

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.

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