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Submission 712
Supplementary submission – Centrifuges

The complexity of industrial engineering

Summary
The 'last-minute' inclusion of the centrifuge extraction method raises further questions, if the potential, biophysical effects of this action are to be ascertained. The purpose of the questions is to assess both the possibility and the probability of whether or not certain, negative, environmental consequences will result from of a proposed, economically motivated action. I feel these questions are necessary because an apparently good, short-term, economic proposition may prove to harbor potential, long-term, detrimental, environmental effects of which legacy cost of this high-risk, open-ended experiment with the burden of failure unfairly imposed on future generations, is inconsistent morally and ethically, legally, strategically, and operationally to society. By this, I mean a good, short-term, economic decision may, in fact, turn out to be a bad, long-term, ecological decision, which therefore is a bad, long-term economic decision—to which delayed, social-environmental costs are always attached, costs the present generation is passing forward to those of the future.

For the addition of the centrifuge process, it would be only just that Kalbar are required to go back to 'square one', review and redesign the entire mine project and resubmit a new EES. This may seem labour and time intensive, however considering the spruiked economic benefits to all and sundry, the 'extremely' high value of the resources that could be obtained over a long period of time (20 years), the 'dedication' to the local community by the new owners, then a redesigned and resubmitted EES shouldn't be too much of a bother.

Some salient points

Ramifications of failure

- Insurance
  One would expect some difficulty in obtaining adequate insurance in such a unique proposal, considering the additional ad-hoc impact and effects documents so rapidly provided with the new changes and additions. This is high risk and not conducive to long-term, sustainable resource extraction and processing operations. On risk management alone, it is a bad investment – as mining accidents around the world attest.

- Breakdown
  The more complex and complicated any industrial process is, the more chance of engineering failures and the unknown outcomes that ensue – human and environmental exposure to unprocessed concentrates and contaminants. As I farm downwind and downstream, it will directly affect my agricultural operation.

  Specialist processes, complex engineering are not separate to the whole resource extraction process. If one small part of the system fails, it effects the whole system. I haven't read in any of Kalbar's studies, the identification of associated risks, events and effects when this occurs.

- Contamination
  As far as I have read there are no risk and effect analyses of any new waste substances that will enter the environment and their behaviour once added to the environment in the mine footprint and downstream into the ocean. Nor how these contaminants behave and enter the food chain when recombined with toxicants already present. As I farm downwind and downstream, it will directly affect my agricultural operation.

- Water re-use and its changed chemistry
  Claims of a small water saving is admirable, but nonetheless not that significant considering the total demands of the entire system for the next 20 years. There is no evidence of a risk and effects analyses of how the changed water chemistry will impact the environment and everything that relies on a healthy environment, clean air and water – which are part of the global commons and everyone's birthright. As I farm downwind and downstream, it will directly affect my agricultural operation.

Inputs

- Energy / electricity
  I see no analysis of the new energy demands of the centrifuge dewatering system and associated processes. Can the grid cope? Who pays for the upgrades? Is the taxpayer potentially going to subsidise this?

- Additives
  With any new process, new recipes, prescriptions of use and waste are used. This has an impact in every step of the process. This hasn't been adequately researched; just added / modelled / extrapolated / or compared to some other mine on the other side of the world.

- Cost of production
  As with any resource extraction industry, the drive to lower costs of production will always be the aim. Ironically, with new and complex industrial engineering systems, they require a higher degree of maintenance and oversight. One could argue more jobs, however, this is offset by more downtime and higher labour costs as the need for specialisation inevitably occurs. Downtime affects every other part of the operation. For example, so the earthmoving equipment can keep operating, more stockpile area is needed; containment measures haven't factored in bigger volumes; natural climate events accentuate disasters and so on. This equals system failure. Worst case scenarios haven't been included in any study.

- Parts, oils, lubricants, consumables
  There is no risk and effects analyses of what, how much, toxicity etc of what it takes to have a centrifuge operational. This adds to the toxicological load that humans and the environment will be exposed to, 24 / 7, for the next 20 years. As I farm downwind and downstream, it will directly affect my agricultural operation.

  What is the operating life of a centrifuge using water from our environment, and the actual soils extracted from the Fingerboards Site?

Outputs

- Operating wastes
  There is no documentation how and where these contaminants will be disposed. It's doubtful the Shire's local landfill could accommodate industrial waste. This could breach EPA regulations and / or add significantly to operating costs.

- Sludges and the chemical composition
  The cumulative effects of changed chemical composition and their behaviour in the environment haven't been demonstrated, nor how far they will impact before their undetectable point. This has the potential to directly affect my agricultural operation.

- Noise 24/7
  To state that 3 centrifuges running 24/7 and a changed extraction and haulage plan will not adversely contribute to current noise levels is farcical.

- Pollution and its recombination with upwind contaminants such as the proposed battery recycling facility in the LaTrobe Valley
  There is no study of the effects of any recombination of pollutants coming from outside the mine footprint, nor the new facility required for the centrifuges. As I farm downwind and downstream, it will directly affect my agricultural operation.

Footprint of the new facility

- Changed access and egress routes
  This has to inevitably alter the mine design and extraction methodology, which then will have other knock-on effects. What changes have been proposed are based on past surveys and a desktop analysis and don't reflect realities at the site. This will affect noise, visual amenity, rehabilitation, energy use, water and rainfall impacts, machinery requirements, timing of delivery of extracted material to the centrifuge and many other factors.

- Permanency of structures (changed soil compaction and long term contamination conditions)
  This will adversely affect any decommissioning, and rehabilitation aspirations and outcomes – current rehabilitation strategies will fail and rehabilitation costs will significantly blowout. This demonstrates that rehabilitation budgets are nowhere near enough, and the government environmental bond is too low. We already have the taxpayer funded Benambra Mine rehab project that went over budget by 2+ million dollars and the tailings dam leaks more than before the rehab project started - in our region, along with other disused, abandoned, and unrehabilitated quarry and mine sites.

These points raise many questions that continue to go unanswered

These following questions are important with respect to Kalbar's proposed centrifuge extraction facility at the Fingerboards and the Mitchell River because the area is part of a sinuous, continuum of habitats that transports water and all its ingredients, both good and bad, downstream while recognizing neither human boundaries nor human measures for its containment—as every major mine failure and oil spill has abundantly demonstrated**:**

1. How can the "affected area" of the Fingerboards and the Mitchell River be limited to the footprint of Kalbar's centrifuge facility, when that footprint is an integral part of a continuous, interactive ecosystem that will, through cumulative impacts, affect all aquatic and terrestrial life that lives within it, drinks its water, and/or uses its vegetation as food—especially during periods of drought?
2. How will the 24/7 exposure of noise, air, soil, water toxic pollutants from Kalbar's centrifuge facility affect the physical configuration and stability of the Fingerboards and Mitchell River ecosystem, which has evolved to cope with periods of high water and low water? Has this been researched? If not, why has no research been done? If so, what are the results?
3. Will the environment become destabilized by a 24/7 exposure of noise, air, soil, water toxic pollutants? Will the critical habitats formed by terrestrial inputs be affected? Has this been researched? If not, why has no research been done? If so, what are the results?
4. What will be the cumulative effects of the chemicals and toxicants that will be added to the Fingerboards and Mitchell River ecosystem from 24/7 for 20 years of operations especially during drought when everything in the water of the Fingerboards area and Mitchell River concentrates into a small per-unit area, and wildlife come to drink the water? Has this been researched? If not, why has no research been done? If so, what are the results?

5. Where will the changed chemical compounds and chemical pollutants concentrate in a drought-stricken Fingerboards and Mitchell River ecosystem?

- in the vegetation that uses the water for survival?
- in the aquatic and terrestrial animals, including livestock, that use the vegetation and/or water for survival?

Has this been researched? If not, why has no research been done? If so, what are the results?

6. What is the biophysical fate of the various chemical compounds discharged from Kalbar's centrifuge facility once they enter the Fingerboards environment then the aquatic ecosystem of the Mitchell River?

- How toxic to the ecosystem are the chemicals? Has this been researched? If not, why has no research been done? If so, what are the results?
- How biodegradable, in fact, are the chemicals in the discharge from Kalbar's facility? Has this been researched? If not, why has no research been done? If so, what are the results?
- Have the "active" ingredients of the chemical compounds discharged from Kalbar's facility been tested for their toxicity to the Fingerboards and Mitchell River ecosystem and its food chain? If not, why has no research been done? If so, what are the results?
- What recombination can and might the "active" ingredients make with the chemical compounds already in the Fingerboards and Mitchell River ecosystem? Could they become more toxic than the chemical compounds discharged in the centrifuge process? Has this possibility been tested? If not, why has no research been done? If so, what are the results?
- Have "inert" ingredients in the chemical compounds in the discharge from Kalbar's facility been tested for their toxicity to the Fingerboards and Mitchell River ecosystem and its food chain? If not, why has no research been done (after all, *there's no such thing as an inert substance in any interactive system*)? If so, what are the results?
- What recombination can and might the "inert" ingredients make with chemical compounds already in the Fingerboards and Mitchell River ecosystem? Could a recombination become more toxic than the chemical compounds discharged in the centrifuge process? Has this possibility been tested? If not, why has no research been done? If so, what are the results?
- How biodegradable, in fact, is a potential recombination? Has this been researched? If not, why has no research been done? If so, what are the results?
- Where in the ecosystem do the discharged chemicals from Kalbar's facility accumulate—especially during a drought? Has this been researched? If not, why has no research been done? If so, what are the results?
- What are the synergistic, biophysical effects (positive and negative) of the chemicals' concentration? Has this been researched? If not, why has no research been done? If so, what are the results?

7. During floods, how far from the Mine footprint does the water go? Does it collect in low areas? How long does it stand? Do the plants in these flooded areas take up more chemical pollutants than they would otherwise do? Has this been researched? If not, why has no research been done? If so, what are the results?
8. Assuming the plants of flooded areas absorb greater amounts of chemical pollutants from the discharged waste-water, how does the consumption of the contaminated vegetation affect livestock and wildlife? Has this been researched? If not, why has no research been done? If so, what are the results?
9. How far will the discharged chemical compounds from Kalbar's centrifuge facility be transported downstream through the Fingerboards and Mitchell River ecosystem? At what

distance in kilometres will they cease to have a negative effect? Has this been researched? If not, why has no research been done? If so, what are the results?

10. At their farthest detectable point:

- What other chemical compounds will those discharged from Kalbar's centrifuge facility recombine with (those discharged by communities in the Fingerboards area and along the Mitchell River) on their journey downstream from the point of discharge? Has this been researched? If not, why has no research been done? If so, what are the results?
- How toxic will a potential recombination be? Has this been researched? If not, why has no research been done? If so, what are the results?
- How will a potential recombination affect the micro-plants and animals that form the basis of the food chain that feeds the aquatic invertebrates that feed the fish and frogs, that, in turn, feed the snakes, herons, eagles, and so on—especially during droughts when the water is already low and will concentrate wildlife and all pollutants into a small unit of area? Has this been researched? If not, why has no research been done? If so, what are the results?