23 October 2019

Ms Elle Cleméntine
Contact Planner
NSW Department of Planning, Industry and Environment

Dear Ms Cleméntine

Submission regarding McPhillamys Gold Project, Application Number SSD-9505

I refer to the above matter and submit the following application regarding the impact that the proposed gold mine will have on the health of wild and managed bees and the beekeeping industry in the area surrounding the mine. I am a Honey Bee Ecotoxicologist interested in the short and long term impact of exposing bees to heavy metal contamination that often occurs with gold mining. After reading the environmental assessment submitted by representatives of Regis Resources Limited, I acknowledge that some measures have been taken to protect the local environment, however, no protective measures appear to be proposed for the protection of bees and the local honey industry. For these reasons I have developed an ecological risk assessment, after visiting the proposed gold mine site and meeting with a local beekeeper.

Goldfields Honey Bee and Pollination Services Pty Ltd (hereafter referred to as Goldfields Honey) has a factory which processes and packages honey, and numerous apiary sites throughout Vittoria State Forest, north, west and east of the proposed gold mine site. Regardless of the mitigative actions proposed to protect human receptors from the contaminants produced by the mine, multiple exposure routes will exist for bees and therefore consumers of honey (Table 1). For example, Arsenic is a contaminant commonly found in gold mine tailings dust and is readily taken up by plants where it translocates to nectar and pollen, which are both consumed by bees (Casado et al., 2007). Surface water, contaminated with mine dust is another route of exposure to bees. Arsenic in plant nectar, pollen and surface water will be returned to the bee colony and may contaminate honey which is later consumed by both bees and humans (Casado et al., 2007; Islam et al., 2014). Of note is that the honey produced from Vittoria State Forest is unique due to the Blakely's Red Gum Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (listed as an endangered ecological community under the NSW Biodiversity Conservation Act 2016), a high altitude forest found nowhere else in Australia. The contamination of this unique honey source would have extensive economic implications to Goldfields Honey.

After conducting a hazard assessment I am proposing mitigative and monitoring action for the protection of wild and managed bees and the beekeeping industry in the area surrounding the proposed gold mine. Please find below details of the contamination source, impact and recommended mitigative and monitoring actions (Table 1).

Table 1. Contamination sources, impacts and recommended action for McPhillamys Gold Project

Contamination source	Impact	Recommended action
Dust - contaminated with heavy metals (p 24 Table 4.3 of AQGHG)	Dust on trees resulting in contaminated pollen and nectar causing bee mortality and contaminated honey	Quarterly honey samples taken from each apiary site for independent testing. Goldfield Honey to nominate laboratory. Testing to be paid for by Regis Resources Ltd. Copies of test results to all parties. Quarterly monitoring of vegetative leaf tissue for dust. Random samples to be taken from trees along the boundary of Vittoria State Forest closest to the proposed mine site. If positive detects of contaminants occur, or hive loss at greater than previous records, Goldfields Honey to receive compensation for loss of honey and/or hives at market value. In the event that a recall of honey is required, compensation to also be made for market value of honey recalled and any associated costs. In the event that bees must be replaced due to contamination, compensation to be made for loss of income for ongoing seasons until the bees are replaced. Additional dust deposition gauges and HVAS air samplers with real time PM2.5 and PM10 monitoring, to be located on the north, west and eastern boundaries of mine. This would allow mine to be proactive and implement mitigative action.
	Contaminants from dust on ground around trees may enter soil and be taken up by tree roots, translocate to flowers and be available to bees Contaminants from dust may enter surface water which is consumed by bees causing bee mortality and contaminated honey	
	Residues in hive causing bee mortality and honey contamination	
	On roof and interior of Goldfields Honey factory resulting in contaminated rain water, honey processing equipment and honey	Quarterly rain water samples and factory honey samples taken for independent testing at expense of Regis Resources Ltd. Copies of test results to all parties.

		If positive detects of contaminants occur, Goldfields Honey to receive compensation to cover cost of water replacement and loss of honey at market value. In the event that a recall of honey is required, compensation to also be made for market value of honey recalled and any associated costs.
Tailings dam which is contaminated with mining contaminants	Bees may drink water from tailings dam resulting in toxicity and mass mortality Bees may collect water from tailings dam and return to hive, contaminating honey and causing in-hive bee toxicity and mortality	Cover tailings dam with bee proof cover with hole size no larger than 3 mm width/diameter. Suitable materials would be UV resistant shade cloth/netting or metal mesh. Testing and compensation covered as per above in recommended action for dust.
Lights from night work (p 103 of VIA)	Bees will be attracted to lights at night potentially causing mass bee mortality (Winston, 1987)	Provide Goldfields Honey with fencing that can be placed as a barrier between their hives and the light source. Suitable barriers would be portable fencing (e.g. building site temporary fencing) and shadecloth that can be attached to the fencing thereby blocking/diffusing light
Blasting during open pit mine operations	Ground vibration and over pressure may collapse the internal structures in the hive and stress bee colonies resulting in the colonies absconding (Winston, 1987) Gas emissions during blasting (e.g. NOx) may be detrimental to bee health	If hive loss occurs due to internal collapse, bee death and/or absconding following blasting events, Goldfields Honey to receive compensation for loss of honey and/or hives at market value. In the event that bees must be replaced, compensation to be made for loss of income for ongoing seasons until the bees are replaced.

Although I have addressed the impact of McPhillamys Gold Project on Goldfields Honey and their managed bee hives, the impact on native bees will be similar (Heard et al., 2017). Currently the greatest threat to all bee species is the pollution and loss of diversity that results from human activity (Grunewald, 2010; Klein et al., 2017; Smith et al., 2013). There are approximately eight species of native bees found in the regions surrounding the

proposed gold mine (Atlas of Living Australia, 2019) and these bees respond to dust, water and light contamination in a similar manner to honey bees (Heard et al., 2017). Addressing the pollution exposure pathways for dust and water will also protect native bees, however light pollution will continue to pose a problem for native bees at the forest verge.

Finally, I request that Regis Resources Ltd nominates a person to take ownership of any issues that may arise both prior to, and during the operation of McPhillamys Gold Project. Goldfields Honey is a key stakeholder in the area and the mine project personnel responsible for communications is requested to contact them prior to commencement of operations to establish communication channels. Contact from the responsible person is also requested during mine operational activities, such as, but not exclusive to blasting, dust generation in exceedance of daily guideline criteria.

Please do not hesitate to contact me if clarification of this application is required. My phone number is 0414 919 650, email: calliesonter@gmail.com.

Yours sincerely

Carolyn Sonter

Honey Bee Ecotoxicologist and PhD Candidate (UNE)
B Env Sci, B Sci(Hons)

References

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