Talking points for the Bowden's Mine IPC Hearing – MP Taylor, Honorary Professor, Macquarie University. Note my professional position as Victoria's CES.
Date of document: 23 February, 2023; date of presentation to IPCN hearing 15 February 2023.

I have provided to the panel via email my Rylstone Olives (Lue) baseline report on soils and dust and my EIS assessment and comments.

Pollution remains a major cause of death at 9 millions / year or ~ 16. This development presents a risk to the local community due to the increased dust and lead concentrations in the ambient environment. There is strong evidence that short-term exposures are equally problematic to human health, which is in contrast to standards and guidelines that typically rely on averaging.

Pollution from the mine operations will be dispersed under suitable prevailing winds across the community and adjacent agricultural producing sites – we know this because of the pollution halos seen at other Australian lead processing sites e.g. Broken Hill, Mount Isa, Port Pirie and the fact that Australian lead pollution is measurable in Antarctica.

Lead contamination in soils and dusts does not 'go away' – it accumulates, and its legacy poses a risk of harm. An example of this is the study we recently completed of backyard Sydney chickens, that showed that soil Pb levels as low as 117 mg/kg resulted in egg Pb concentrations of 100 µg/kg, a de facto safety threshold for eggs to be consumed (https://doi.org/10.1016/j.envpol.2022.119798).

No mine can demonstrate zero off-site impacts – the assessment provided in the EIS uses thresholds and baseline values that are either inconsistent or out of date, which undermines the confidence that off-site impacts will be managed properly or will be within acceptable limits – should such limits even exist.

Elevated blood leads around lead mines and processing facilities are always present. Indeed, even after operation have ceased blood leads remain relatively elevated versus back ground populations due to legacy left.

An example of this is the former lead smelter at Boolaroo, Newcastle, that resulted in significant environmental contamination around the site. Though NSW Health blood lead levels (measured in 2015) in children < 5 years of age were below NHMRC levels of concern (5 µg/dL), several were between 3 to < 5 µg/dL, and can be categorised as being elevated relative to the current background of blood lead concentrations in children ~ 1 µg/dL.

A primary environmental challenge in relation to this proposed mine, as identified in the proponents EIS, is dust and the management of dust from the site. Other experts will have or will adduce evidence that the available water to suppress dust will not be sufficient.

Why is this critical? In all of the studies I have undertaken at lead sites – e.g. Broken Hill, Port Pirie or Mount Isa coupled to urban contamination from the former use of lead in paint and petrol, shows explicitly that lead in dust is the key concern.

By way of example is the evidence of human response to lead dust from petrol. Approximately 75% of lead used in petrol was emitted from vehicle exhausts into the adjoining environment. As a result, blood leads in children, the most vulnerable portion of the population due to their age and hand to mouth behaviours, rose.

As lead concentrations used in petrol were reduced, blood leads fell in children – we know this is a true relationship because lead petrol emissions were correlated at a near perfect 1:1 relationship at 0.9 (http://dx.doi.org/10.1016/j.apgeochem.2017.02.007; refer to the figure below).

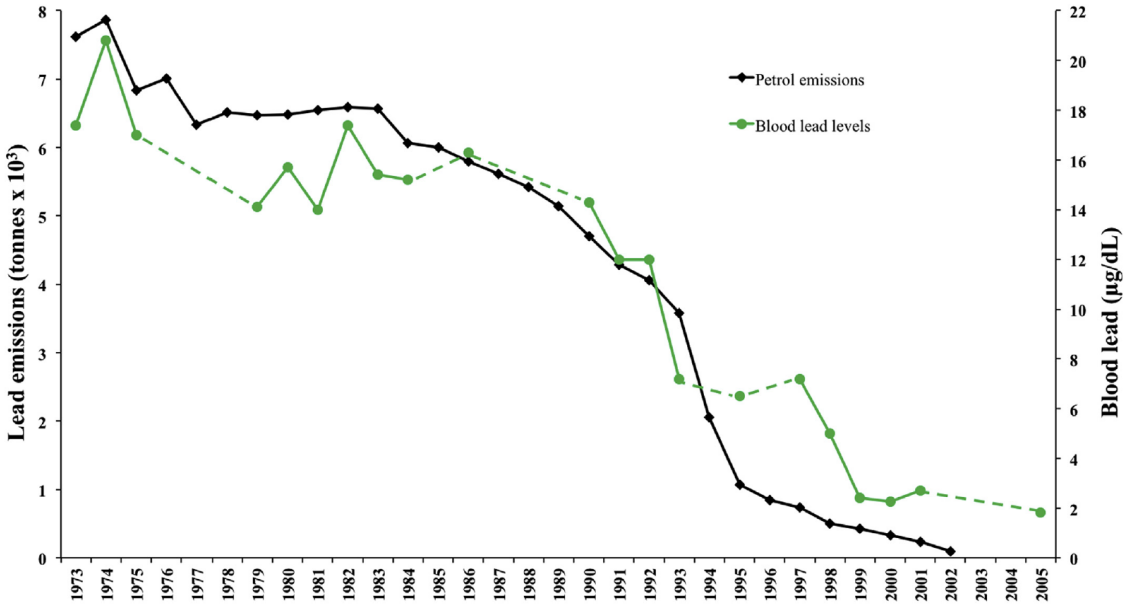

Fig. 4. Declining blood lead levels in Australian children and lead emissions. Blood lead data from literature for Australian metropolitan cities: Hobart, Melbourne, Sydney, and Wollongong (Bloom et al., 1974; Cooney et al., 1989; Cowie et al., 1997; De Silva and Donnan, 1980; Donovan, 1996; Fett et al., 1992; Gan et al., 1982; Garnys et al., 1979; Gulson et al., 2006; Guttinger et al., 2008; Hopper et al., 1982; McBride et al., 1982); petrol lead emissions data from Kristensen (2015).

Even though the soils of cities remain contaminated, blood leads fell because ambient lead dust levels dropped and homes and hands were no longer being coated with the toxic metal. In lead processing towns, lead dust is prevalent, it permeates homes and results in exposure. This is why lead dust is a critical concern in this proposal. The proponents have not, in my view, showed that there will be no adverse impacts off site.

In terms of non-human responses, environmental systems will absorb and remobilise trace elements.

For example, we have shown unequivocally that bees and other biota mobilise Pb-rich (and other metals) in dust and it passes into the food chain. This demonstrates unequivocally that any pollution that is dispersed off-site and be remobilised into environmental and food systems in the local regions, negatively affecting food quality and agricultural value (see the figure below).

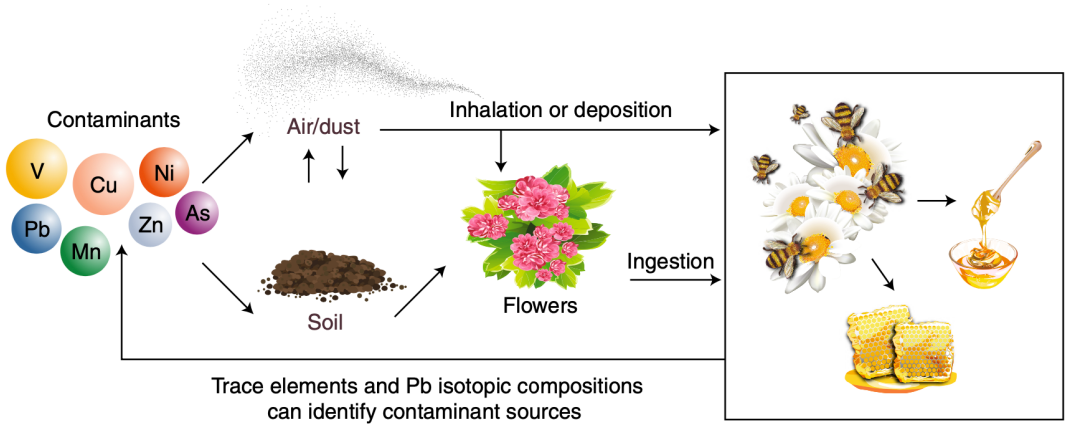

Fig. 1 | Honey bee exposures to trace element contaminants. Environmental sources of metal and metalloid contaminants held in air, dust and soils can be accumulated on and in honey bees, which then transfer these to their beehive products (wax and honey). Adapted from ref. [8], ACS.

Source: Taylor, M.P. 2019. Invited commentary. Bees as Biomarkers. Nature Sustainability, 2, 169-170. https://doi.org/10.1038/s41893-019-0247-9.

Trace contaminants are demonstrable harmful to insects – trace levels of Pb, Mn etc cause neurological disruption limiting foraging efficacy and productivity (Monchanin et al. 2021, https://doi.org/10.1242/jeb.241869; Søvik et al. 2015, https://doi.org/10.1098/rsbl.2014.0989). Such effects on bees may be considered sentinel markers of harm to other environmental and human systems.

Therefore, my assessment is that dust will be the key for exposure and this site will be dusty – every mine site in hot and dry locations in Australia shows this and negating off site impacts have never been achieved. Only 'acceptable' off-site impacts have been achieved, but with respect to lead, there are no 'safe' or even acceptable additional limits especially where people are involved.

Future dust control will be critical

Dust will be a key because:

1. The environment is dry;
2. The dry/drying climate will exacerbate dust and increase challenge of keeping it under control;
3. Biota and food stocks will be exposed from environmental dispersal of dust and associated contaminants;
4. For early all contaminants there is no safe level; just an acceptable threshold;
5. Exposure effects are proportionally greatest at the lowest exposure levels (https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2003066).

Dust standards applied for protection in the EIS are outdated and any iteration of the EIS needs to embrace world's best standards and guidelines for dust lead as have been used in

other Australian states and territories. In the ACT, the Education Directorate adopted lead thresholds that are in line with international best practice developed by the U.S. Department of Housing and Urban Development (HUD) and the US EPA. These are detailed in my assessment of the EIS and do not need to be repeated here.

Unaddressed matters:

- Can the operations guarantee there will be no off-site impacts and adverse outcomes?
- No safe / acceptable level is established for human exposure let alone biota. There are thresholds of 'acceptability', but these should not be confused with levels of safety.
- Will there be a baseline blood lead study and ongoing assessment of homes and biomarker exposure to ensure mine-practices are effective and protective?
- Can the operation guarantee that local produce including, livestock, wine, olives and its oil will remain free of contamination?
- The proposal has not quantified the short and long costs of distress and worry (mental health and wellbeing) on the impacted communities.