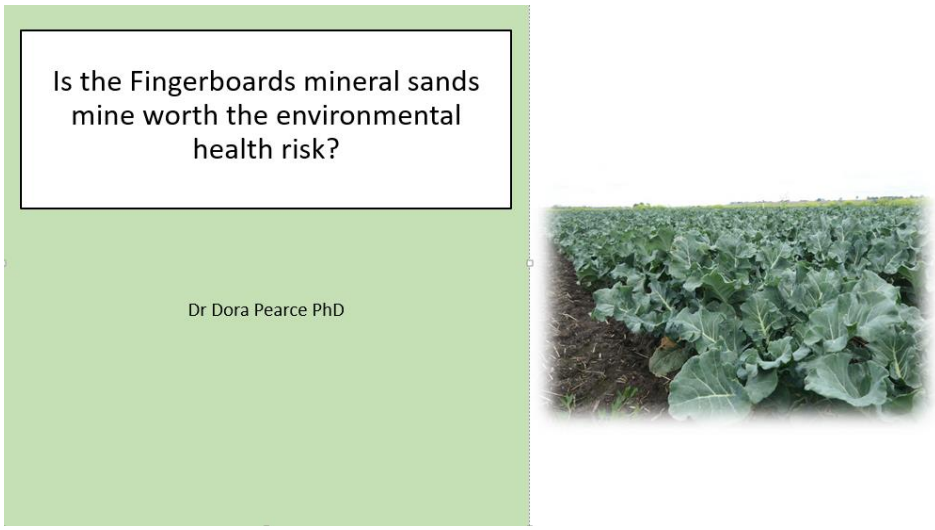
Dr Dora Pearce PhD: Submitter 241: Fingerboards Panel Hearing text by slide

Slide 1:



Thank you, Mr Chairman, for the opportunity to express my concerns about the proposed Fingerboards mineral sands mine.

My background is in environmental epidemiology, having investigated arsenic uptake from contaminated soil in childhood, and demonstrating a link between soil arsenic concentration and cancer incidence across Victoria's goldfields region. I hold honorary affiliations with the Melbourne School of Population and Global Health, The University of Melbourne, and the School of Engineering, Information Technology and Physical Sciences, Federation University Australia.

As an Environmental Epidemiologist, I ask the question: Is the Fingerboards mineral sands mine worth the environmental health risk?

And remind you that nearly 200 years later, we are still grappling with the environmental health legacy of Victoria's gold rush. Let's not make the same mistakes with rare earth mining.

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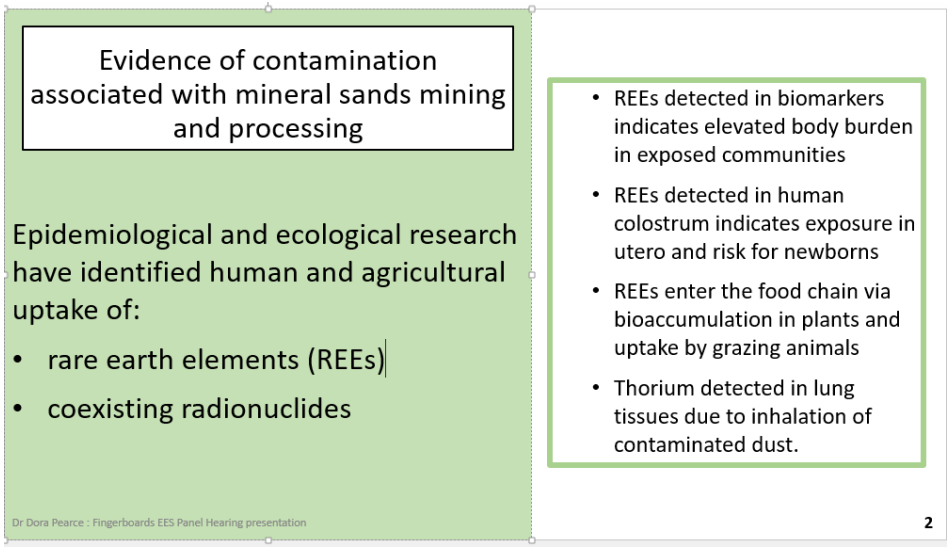

Globally, evidence of contamination associated with mineral sands mining and processing has emerged.

Epidemiological and ecological research have identified human and agricultural uptake of rare earth elements, and their coexisting radionuclides.

REEs have been detected in biomarkers, indicating elevated body burdens in exposed communities.

REEs have also been detected in human colostrum, raising concerns of exposure in utero and risk for newborns.

Further, it has been demonstrated that REEs can enter the food chain via bioaccumulation in plants and uptake by grazing animals

Importantly for mine workers AND the potentially exposed community, Thorium has been detected in lung tissues subsequent to inhalation of contaminated dust.

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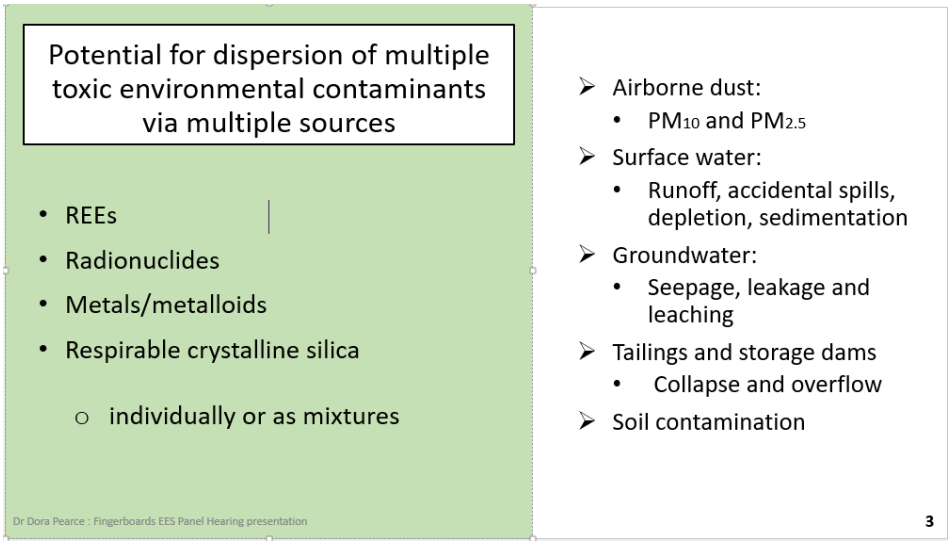

The Fingerboards project has the potential for dispersion of multiple toxic environmental contaminants via multiple sources during routine activities,

- whereas unplanned incidents such as extreme weather events, collapse or overtopping of dam walls, could further result in catastrophic environmental and ecological impacts.

Of concern is that contaminants may variously include rare earth elements, radionuclides, metals and metalloids and respirable crystalline silica,

- individually or as mixtures,
- in a range of environmental media.

Dust from mining may consist primarily of coarse particles, but fine particles such as PM_{10} and $PM_{2.5}$ may also be generated.

Surface water could be impacted through runoff, accidental spills, depletion and sedimentation;

Groundwater may be contaminated through seepage, leakage and leaching from tailings.

Soils in this intensive agricultural area are also at risk of contamination.

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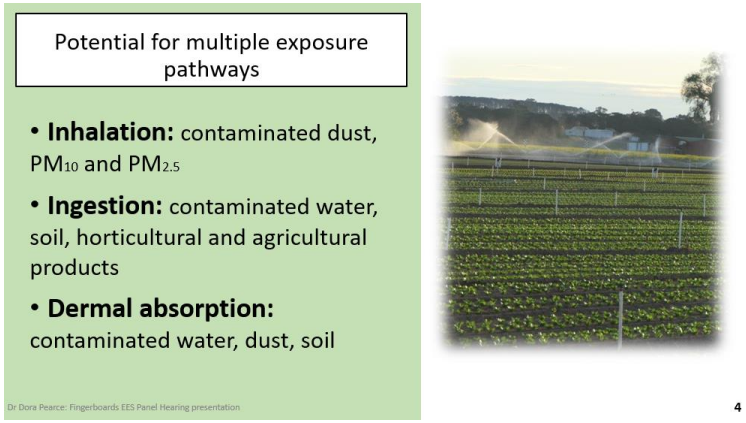

The potential for multiple exposure pathways exists.

Coarse dust may cause a visual nuisance, but fine particulates generated during the mining process are of greater concern,

- not only because they penetrate deeper into the lungs,
- but because contaminant concentrations are often greater.

Fine particles also travel further,

- leading to offsite exposures via inhalation and ingestion of potentially toxic elements.

Ingestion of toxic contaminants via the food chain and drinking water could occur as a consequence of dust fallout directly onto

- water storage dams and rain water tanks,
- horticultural products and agricultural soils,
- or watering crops using contaminated surface water or groundwater.

Dermal absorption due to direct contact with dust, soil and contaminated water is also

- a potential exposure route to more soluble toxic compounds.

As a consequence of any, or a combination of many, exposures, the health and wellbeing of neighbouring communities could be undermined.

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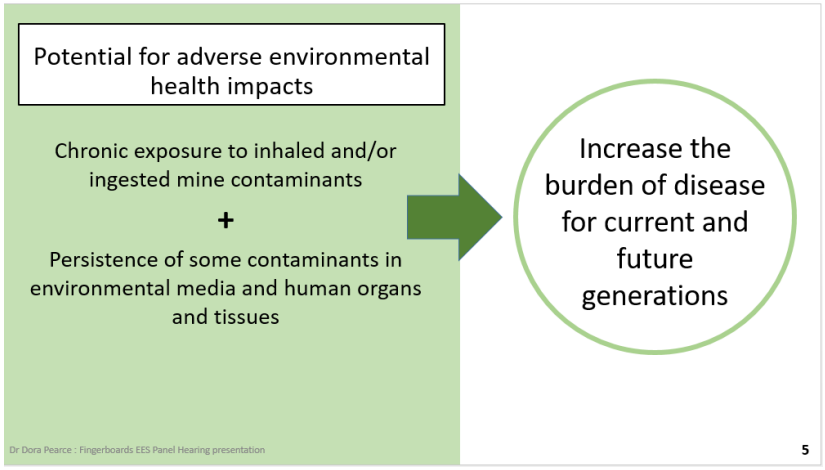

The potential for adverse environmental health impacts is exacerbated because

- the risk of exposure scenarios is not limited to single contaminants or single episodes,
- but multiple contaminants and cumulative exposures.

Chronic exposure to inhaled and ingested mine contaminants, over the proposed lifetime of the Fingerboards project and beyond, is of great concern,

- given the persistence of some contaminants in environmental media and human organs and tissues.

Such exposures threaten to increase the burden of disease for current and future generations.

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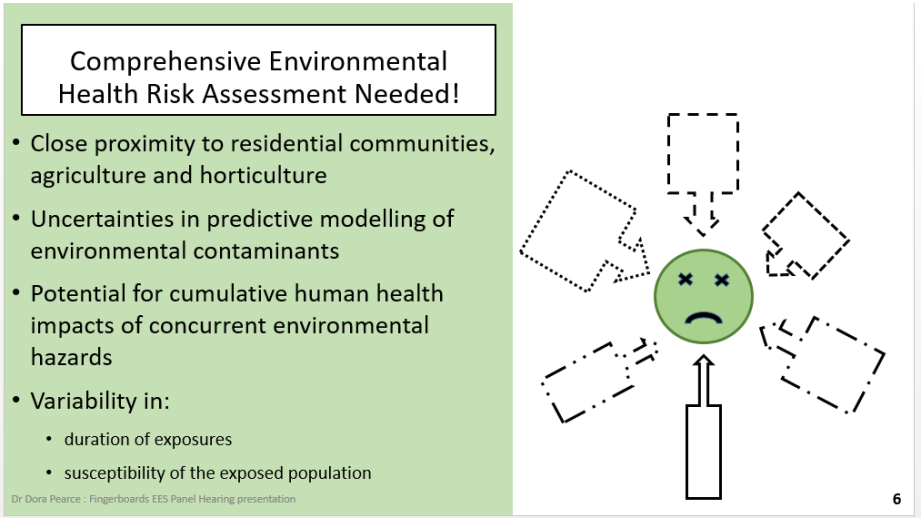

A comprehensive environmental health risk assessment is crucial, given:

- the close proximity to residential communities and agricultural and horticultural industries

and

- the uncertainties in predictive modelling of individual environmental contaminants.

Environmental Health Risk Assessment aims to evaluate the potential cumulative human health impacts of concurrent environmental hazards, taking into account:

- the duration of exposures,
- the extent and susceptibility of the potentially exposed population due to pre-existing comorbid conditions, social and cultural characteristics,
- synergistic effects,

and

- lag time until disease onset.

Children are particularly sensitive receptors of environmental exposures

and

- subsequent generations may be put at risk due to epigenetic mechanisms.

Although the *Human Health Risk Assessment* by Coffey (2020) identified numerous environmental issues that could occur unless best practice is implemented,

- their Tier 1 approach - a comparison between modelled exposure predictions and health-based criteria –
- is potentially limited by uncertainty and oversimplification,
- and may have failed to predict possible adverse health impacts on exposed communities.

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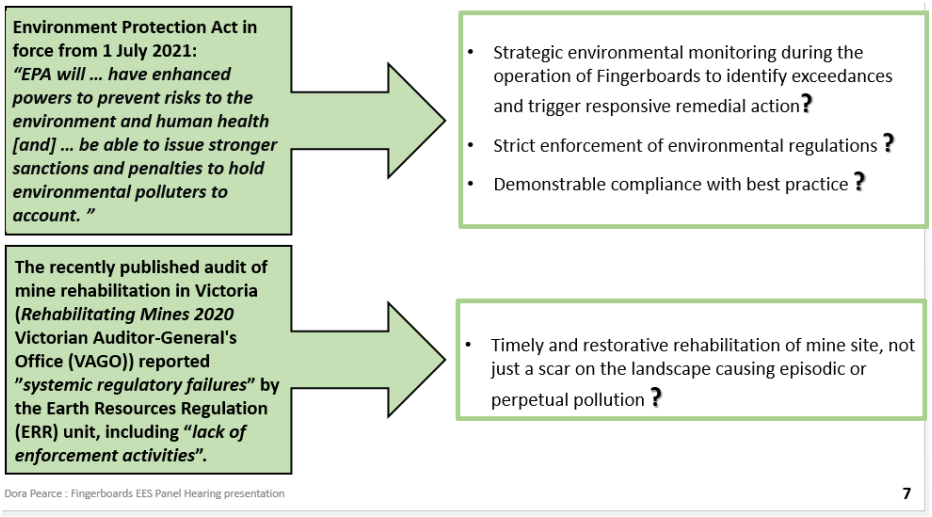

From 1 July 2021, the new Environment Protection Act comes into force.

This will give the EPA enhanced powers to prevent risks to the environment and human health

- and to issue stronger sanctions and penalties, holding environmental polluters to account.

Does this mean that, if the Fingerboards project is approved, the Community can expect:

- Strategic environmental monitoring during the operation of Fingerboards to identify exceedances and trigger responsive remedial action?
- Strict enforcement of environmental regulations?

and

- Demonstrable compliance with best practice?

The recently published audit of mine rehabilitation in Victoria (by the Victorian Auditor-General's Office 2020) reported "systemic regulatory failures" by the Earth Resources Regulation unit, including "lack of enforcement activities".

Does this mean that, if the Fingerboards project is approved, the Community can expect:

- Timely and restorative rehabilitation of the Fingerboards mine site,

OR

- just a scar on the landscape causing episodic or perpetual pollution?

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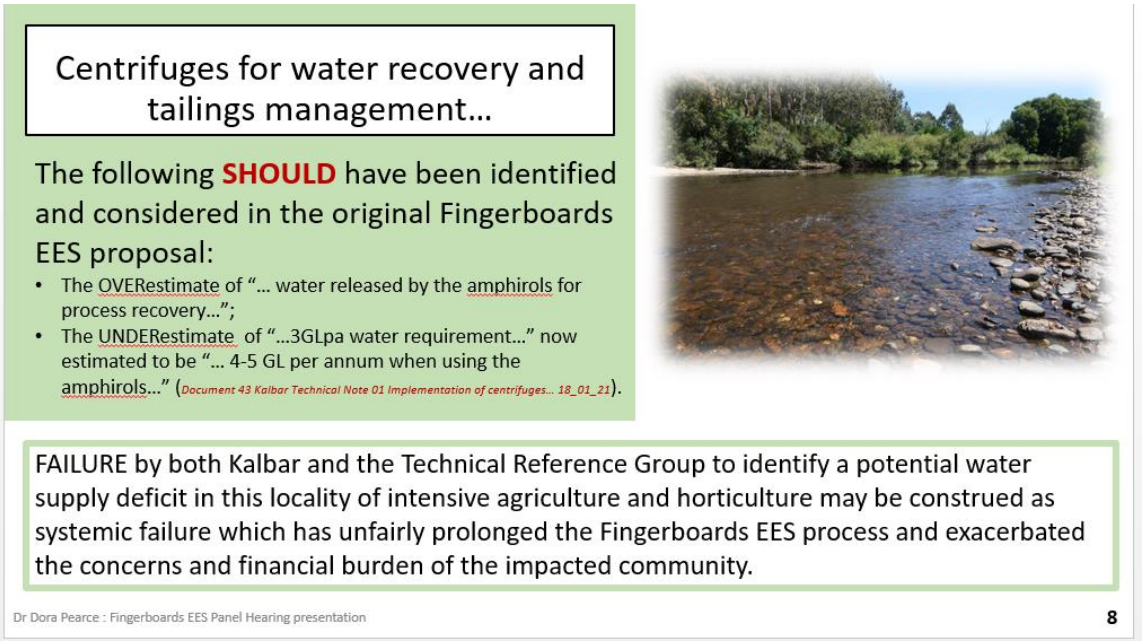

Whether or not the use of centrifuges for water recovery and tailings management

- would ultimately be advantageous, and
- effectively prevent or minimise offsite environmental contamination,

the failure by both Kalbar and the Technical Reference Group to identify a potential water supply deficit in this locality of intensive agriculture and horticulture during the original Fingerboards EES development may be construed as a systemic failure of this EES process.

Water conservation; and quality protection of groundwater and surface water; are crucial given Australia's arid climate and the impending impacts of Climate Change. Any unmitigated depletion and/or pollution of our scarce water resources will have severe consequences.

Hence the belated identification of these egregious errors in the Fingerboards EES:

- The OVERestimate of "… water released by the amphirols for process recovery…";
- The UNDERestimate of "…3 GLpa [Gigalitres per Annum] water requirement…" now estimated to be "… 4-5 GL per annum when using the amphirols…"

are cause for serious concern.

These belated modifications by Kalbar have unfairly prolonged the Fingerboards EES process,

- added to the complexity and volume of technical documentation – sometimes with demonstrable uncertainty and conflict between expert opinions –
- and exacerbated the concerns and financial burden of the community opposing the Fingerboards project.

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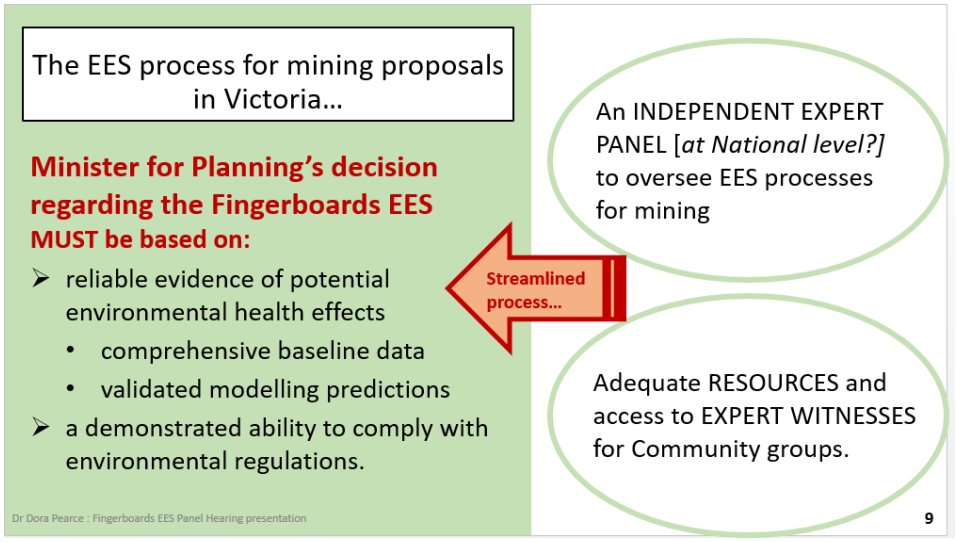

It is imperative that the Minister for Planning's decision regarding the Fingerboards EES be based on:

- reliable evidence of potential environmental health effects that are likely to occur under the worst case scenarios arising from all potential sources of pollution,
- both anticipated and unplanned.

This can only be derived from:

- comprehensive baseline data which is scientifically validated and representative geospatially and over sufficient time periods and conditions;

and

- validated modelling predictions derived using substantiated models which incorporate all relevant factors and justifiable assumptions.

It must also be demonstrable that the proponent has the technical ability and resources to comply with all environmental regulations during operations

- and to fully implement mine rehabilitation.

The complexity of the documentation presented throughout this EES process has been compounded by the tabling of numerous modifications, "expert" statements and conflicting opinions.

The establishment of an independent expert panel [at State or preferably at National level?] to oversee Environment Effects Statement processes for mining could streamline this process.

Reliance on an expert mining EES panel would reduce the burden on Community groups to defend themselves and their livelihoods throughout long and arduous mining EES processes.

In the meantime, adequate resources and access to expert witnesses must be made available to Community groups to assist them when confronted with such a challenge.

Slide 10:

Given that the magnitude of environmental health risk increases with

- increasing probability of exposure

and

- increasing severity of the adverse consequences of exposure;

the Fingerboards EES has failed to provide assurance that the environmental health risk arising from their proposed mineral sands mine would be acceptable to the potentially exposed Community.

Social and environmental accountability must be prioritised when considering this proposal.

Therefore, in my opinion, the proposal for the Fingerboards mineral sands mine should be rejected!

Thank you, Mr Chairman and Panel Members, for the opportunity to present my submission today.