

Major Projects
State Significant Development (SSD)
New South Wales

COPI Mineral Sands Project Wentworth Shire

Submission to SSD – 41294067

The Bendigo District Environment Council (BDEC) welcomes the opportunity to provide a submission to the Copi Mineral Sands Mining proposal SSD - 41294067.

The BDEC accept the conditions that Major Projects place on the acceptance of submissions.

This submission includes an objection to the provision of an Environment Impact Statement (EIS).

About the BDEC

The BDEC is a community-based organisation with its primary role being the conservation of native forest and in a wide sense the protection of ecological values on a landscape scale.

The failed Bendigo mining project, over the last two decades, has caused considerable environmental damage to the Bendigo National Park, local waterways, farmland and the urban environment. The BDEC therefore by necessity has taken up a roll to advocate for an improvement in the planning and regulation of mining projects.

During the last few years the BDEC has provided, at the request of affected communities, a significant science and engineering based technical submission to six Environment Effect Statements (EES) which included gold, copper and three mineral sand mining projects.

Of these projects only one, a copper mining project, was granted an EES and despite heavy sponsorship funding by the State of Victoria this project has been found to be financially unsustainable.

A gold mining and a mineral sand mining project (Fingerboards) were denied an EES. Two gold projects have been withheld by the proponent and not advanced.

Two mineral sand mining projects (Avonbank and Goschen) have completed an Independent Advisory Committee (IAC) Panel Hearing but have not been advanced by the Victorian Planning Minister.

Victorian landscape for mineral sand mining and the separation of rare earths

There has been no significant 'greenfield' mining development in Victoria over the last three decades. The only significant mining activity, other than coal projects in the Latrobe Valley, is at gold mining sites established during the 1800's.

Most of these projects have become financially unsustainable during the Covid period. It is probable that the only project with a positive cash flow at this time is the Fosterville gold mine (Agnico Eagle) which they have reported has a severely depleted ore body.

The mineral sand mining company Iluka has retreated from its tenements in Victoria and while it still holds exploration licences and has placed feasibility studies before it's investment community it has decided not to advance to the stage of an EES.

First tier mining companies such as BHP and Rio Tinto have historically held exploration licences at mineral sand locations in Victoria but appear to be no longer active.

A company at Donald (Astron) has held a mineral sand mining licence for several years but appears, despite several announcements, not to be able to secure reliable financing for their project.

Most mineral sand mine proposals in Victoria are based on an ore body which occurs in the Loxton Parilla sands and is common to three states. This ore body is in occurrence at the proposed Copi project.

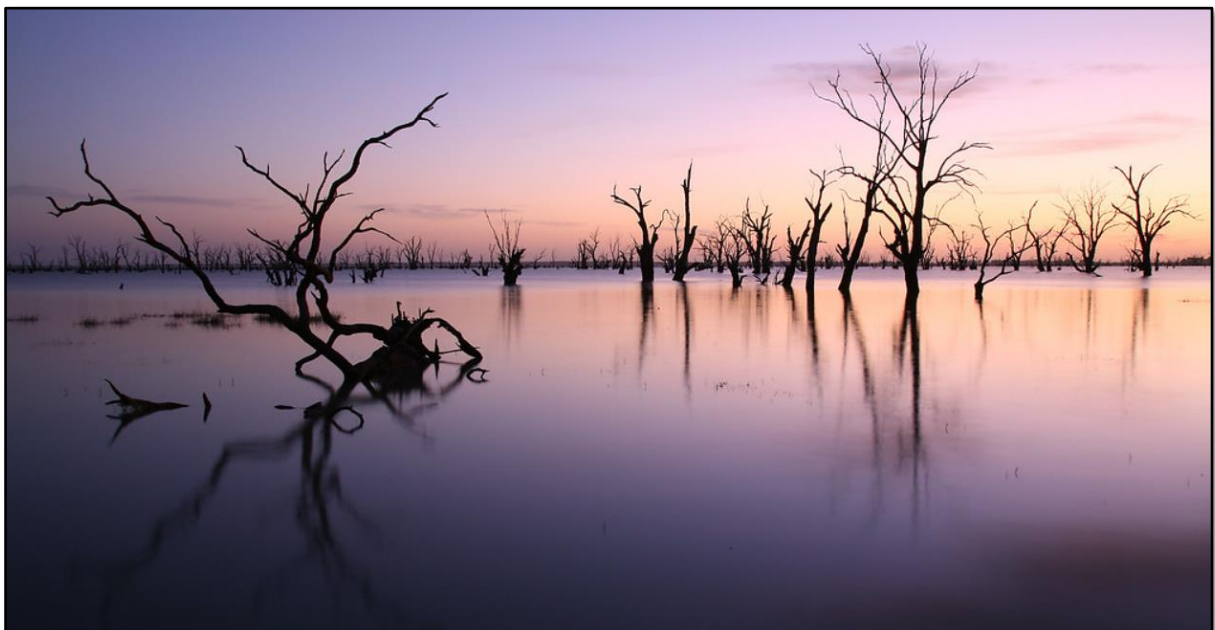


Photo: Lake Victoria pre-dawn New South Wales. Photographer Michael Boniwell

The significance of the Copi project

Earlier mineral sand mining projects in Victoria, to which Iluka was an early contributor, had the advantage of first access to the ore bodies. These projects generally provided a heavy metal mineral concentration of 2~4%. The ore bodies were typically shallow and had a modest strip ratio, that is, the amount of overburden which was to be removed was limited and the subsequent strip ratio was in the order of 2.

In some cases, this did not require mining operations to extend into the groundwater zone (the wetted area). The logistics were managed by the bulk movement by road transport of zircon enriched HMC to the ports of Geelong or Portland using bulk handling and storage techniques. It is unlikely the Copi project would be permitted to utilise these logistics.

Iluka and other operators eventually withdrew from their projects, sometimes as the ore body was depleted but more often as it was financially unsustainable. None of the projects have been fully rehabilitated, and many sites have minimal rehabilitation.

Comments on the failure of the Victorian mining regulator to manage mine rehabilitation are available in the 2019 Mine Rehabilitation report by the Victorian Auditor General's Office (VAGO).

The incomplete description of the Copi project in the exhibited documents makes it difficult to create a comparison to other projects. However, it appears that the ore body available to Copi has a mineral concentration of a little over 1%.

The ore body occurs at considerable depth which requires stripping of a substantial amount of overburden for access so that the stripping ratio is likely to be in excess of 3.

The ore body does extend into the groundwater, and dependent on which document is accessed, is likely to require wet mining, that is by the use of dredges.

Copi will also utilise dry mining techniques for the removal of overburden and possibly some of the ore.

The logistics for the transport of HMC and possibly other products such as monazite to the New South Wales or Queensland coast are extended and energy consuming.

Although mining companies currently use the Australian Critical Minerals Strategy as a reference source to promote their projects, this strategy should be placed in context. The minerals which the Australian government originally placed in the strategy to manage Australia's sovereign risk, both for export income but also as a source to create reliance with their military partners, were minerals such as nickel, cobalt, lithium and rare earths and in particular those minerals required for the green energy transition.

The mineral in common occurrence in mineral sand is Zircon. This mineral is neither rare nor of particularly high value. The mining industry successfully lobbied for zircon to be included as a mineral in the critical mineral strategy, only because its occurrence included a trace amount of rare earth elements.

The international market value of zircon in present day terms has continued to fall during the last decade as indicated in the chart at the completion at the end of this document.

Mineral sand mining can also produce minerals such as ilmenite for the production of titanium-based products. The value of titanium products has fallen in the international market as hard rock mining opportunities have advanced that industry in several eastern European states. (See the chart at the end of this document)

The Copi project has suggested it will provide an industrial plant for the separation of a Rare Earth Concentrate (REC). REC does not provide rare earth elements as market product.

Generally, REC is shipped to Shenge or another location in China where extensive chemical processes, which include the massive consumption of sulphuric acid, is required to strip rare earths from the concentrate. Some of the rare earths produced in China are of considerable value to the computing and defence industries, some such as cerium are common and only have nominal values.

China has now determined that mineral sands are not a productive way forward to recover rare earths and they find it better to recover rare earths from hard rock mines in locations such as Africa and Asia where they can control the ownership of the rare earth product but avoid the high levels of pollution which are a feature of the Chinese rare earth separation plants.

This strategy by China is well described in a publication called the 'Rare Metals War: The Dark side of Clean Energy and Digital Technologies' by author Guillaume Pitron. Although several years old it accurately describes the current monopoly which China holds over the production and sale of rare earths on an international basis and the politics which are associated.

If Copi are to export their HMC or REC direct to China they could reasonably be seen to be in direct conflict with Australia's Critical Mineral Strategy and against Australia's sovereign interest.

Two Australian companies, Iluka and Lynas, with billion-dollar investments, have attempted to establish rare earth separation plants in Western Australia. A third plant has been proposed for Northern Territory. These plants have not progressed to an operational status.

The CEO of Iluka has recently expressed frustration that in his view China is unreasonably withholding the intellectual property he would require to be able to understand the chemical operations that would be required for the stripping of rare earths.

For a period, Lynas has operated a separation plant for several rare earths in Malaysia, but it has been closed on several occasions by the Malaysian government because of pollution events and is not considered sustainable by the Malaysian government.

It is possible that Copi could ultimately transport concentrates from their site to Western Australia for separation of rare earths. The operators of these plants are likely to have established a process which is compatible with the ore bodies before them and therefore not interested in modifying their plant for the lesser recovery rates that might be achieved from East Coast Loxton Parilla sand.

Where is the Copi proposal going?

As a first-time mining company, there appears to be considerable uncertainty about the proposal. The company behind RZ Resources is not ASX listed so without ASX investor reports there is a lack of transparency.

The BDEC has been approached by members of the farming community from the Wentworth district seeking information about mineral sand mining. Farmers expressed frustration that the company had provided minimum of information until the EIS documents were exhibited with minimal notice. RZ Resources appear to fail at the first hurdle to secure a social licence, which can be as important as a mining licence or an EPA development or operating licence.

The company already has a considerable number of compliance failures, as determined by the regulator, that have occurred during the exploration phase. This must create concern that the current company administration may not be able to put forward a suitable person, as required by the mining Act, as a 'fit and proper person' to manage the establishment works.

The proponent has exhibited 27 documents as a report or plans as one component of the EIS documentation. The documents are some 3000 words in length with accompanying chart and graphs.

As the BDEC has only held these documents for around 14 days it is not possible to scrutinise each document in detail. It is therefore possible that comments by the BDEC might contain an inaccuracy or contain an error in a conclusion regarding a particular document if the BDEC has missed a detail in a certain document.

It is of course also not possible to research all of the science or engineering claims that the proponent or their consultants have put forward in the limited time available.

However, the BDEC have had the opportunity during a longer exhibition period to examine three EES proposals in Victoria and prepare detailed reports on those proposals. Each of these proposals was some 6000 to 10,000 words in length and considerably more comprehensive than the Copi exhibited documents.

While the Victorian mining companies presented information which at times could be considered as pseudoscience or at other times as information which may have been falsified or was misleading, in general the proponent provided a technical report on each of the relevant subjects matters as was required by the Scoping Brief.

Unless there is an oversight by the BDEC, the Copi documents do not appear to contain a report as a Radiation Assessment, rather than the document provided by the proponent offering an explanation why they consider that the HMC should not be classified as radioactive.

There is not a report on the accumulated human health risk which would be presented by the proposal, which in part would rely on a suitable Radiation Assessment and a credible Air Quality report.

The proponent also appears to have neglected or avoided several steps which should be 'de rigueur' in a project with a substantial civil engineering content. The first step would be to

construct a test pit which can provide considerable technical information. In particular geotechnical data in the area of pit wall stability and the groundwater conditions. For example, the rate of ingress of groundwater into the constructed pit which then allows a determination of the permeability of the wetted zone.

A test pit can also provide material for the operation of a small sample processing plant which can provide a HMC sample which can then allow a more accurate determination of the JORC or economic value of the project.

It is not clear from the proponents' documentation how they have established the HMC characteristics which they have quoted or the provenance of any sample. It is also unclear how the proponent has determined the radiation emissivity of the HMC stockpile.

The proponent has not provided a draft Work Plan, which makes it impossible to provide sensible comment on many aspects of the project, including the mine operational model, water balance, salt balance, air quality, carbon and climate footprint, rehabilitation plan and an economic assessment.

Comments

The BDEC now seeks to provide a brief comment on some of the proponents reports or assessments.

1. Radiation Assessment

The Radiation Assessment does not provide detailed information on the handling and storage of the radioactive materials, in particular the HMC and the REC.

The assessment should include actual calculations which describe the circumstances of workers as they handle and approach the stockpiles as well as other locations, for instance in the areas of the processing plant where HMC or REC might not be contained in vessels or plumbing.

The physical stockpiles of HMC create considerable risks as the proponent may find it necessary to stockpile some thousands or tens of thousands of tons of HMC on site waiting logistics such as shipping or waiting for a turnaround in market conditions circumstances to create a sale.

HMC stockpiles are a necessity at a mineral sand mine as using the natural weather conditions is the only effective way to drain and subsequently dry HMC to the circumstance where it is ready for transport. During adverse weather conditions HMC stockpiles, which can be 15m or more in height can be a subject to dramatic wind. (See images at the end of this document)

The erosion of HMC by wind creates a number of human health risks. First, HMC dust (which proponent consultants commonly avoid modelling) pollutes rainwater tanks at residences with heavy metals which form a component of the HMC. The HMC dust needs to be further

incorporated in the human health assessment as it is both inhaled, ingested in locally produced food products such as meat, eggs or vegetables, or absorbed by dermal contact.

In the Risk Assessment 6.11.2.3 document, the proponent claims that the handling of concentrate at the port or the Pinkenba processing facility 'is beyond the scope of this report'. However, the attached image at the end of this document appears to show the bulk handling of concentrate on a conveyor belt at a location immediately adjacent a highly utilised public area and must cause doubt that this processing facility could be granted an operating licence.

The examination of the Radiation Assessment was a significant component in the IAC Report to the minister for the Fingerboards proposal. The IAC Panel had requested multiple peer reviews of the Radiation Assessment as provided by the proponent and remained dissatisfied with the proponents assessment.

When consultant reports were prepared for the subsequent Avonbank and Goschen panel investigations, the proponent avoided assessment of the radiation risk to mine workers and claimed that this risk could be established at a future stage by the proponent when seeking further licenses if an EES was granted.

There are a limited number of consultancies in each state which provide Radiation Assessment reports to the mining industry. The BDEC hold the view that the IAC panels at both Avonbank and Goschen held concerns that the proponent had failed to provide assessments in this critical area of worker safety.

The ABC has published an article in which a professor from Melbourne University, an expert in radiation risk, has described the documentation provided by RZ Resources in the area of radiation assessment as "extraordinarily inadequate". (The article is included at the end of this document)

The assessment of dust generation by the proponent's consultant is not credible.

The consultant correctly describes that the larger component of dust generation is by wheel traffic on the haul roads. The consultant then describes that dust can be reduced to 10% of the dust that would have otherwise been generated by the application of polymer as a surface treatment and the application of water as a dust suppressant.

The application of polymer over the large surface areas of the haul roads on a mine site would be cost prohibitive. Similarly, the application of potable water would be cost prohibitive if that water was to be sourced from a reverse osmosis plant. In actuality, a likely minimal suppression of dust will only be achieved by the application of minimum amounts of saline mine water.

The dust generated from haul roads contains a component of amenity dust (PM10) and a component of high-risk silica dust (PM10).

The component of silica dust will cause an elevated risk of harm to human health at residences adjacent to the mine site.

The component of silica dust at each residence is required to be considered along with the accumulation of background dust and the other contributions which cause harm to human health such as the intake of heavy metals, to determine the overall increased risk to human health at each residence and reported in the human health risk assessment.

2. Draft Work Plan

There is no draft Work Plan.

The companies' failure to provide a draft Work Plan limits the capacity for the mining company to prepare other relevant reports and accurate assessments because they do not have the background that the Work Plan provides.

3. Economic Assessment

The Economic Assessment is incomplete.

The assessment claims to present a cost benefit analysis. Only one side of the ledger has been presented, that is a claim for benefits to the community such as employment or expenditure on local goods.

There is no detailed assessment by the proponent on the cost of production of the products to be marketed.

There is no assessment of the cost of labour, energy such as electricity, diesel or LPG, or the cost of services, maintenance, etc.

The consultant report is fully based on only the claimed market value of a product and in a quantity provided by the proponent.

The mining industry, in general, has seen considerable cost increases in energy and labour especially during and since the Covid period which has meant that some projects have become unsustainable. The proponent has made no attempt to estimate these costs as the project moves forward.

The proponent has provided no advice as to how the project would be managed if there was a lack of market (as has happened with agricultural produce exported to China) or if there was the unavailability of energy or labour.



Malleefowl: Listed as Vulnerable nationally, now limited to arid and semi-arid parts of inland West Australia, 8 South Australia, Victoria and central NSW.

4. Air Quality

The Air Quality document reports an annual carbon dioxide production of just less than 40,000 tonnes. This figure does not include the accumulated figure for the road and rail transport of product to port, the shipping of product to ports in China or elsewhere and the interstate transport of FIFO workers etc.

It is difficult to imagine a more energy intensive and less productive industry if this project purports to provide products for the green energy transition.

A typical wind turbine requires the incorporation of approximately two tonnes of the three rare earths which, combined, produce the magnetic component of the turbine. An operational turbine on average produces around one gigawatt of sustained electrical output. If consideration is made for the carbon footprint for the construction of this project, it would be many years before this project could even be considered carbon neutral by the way of the greenhouse energy production infrastructure which could be manufactured by the Copi extraction of rare earths.

The proponent has chosen to provide up to 40 GW of diesel electrical generation plant despite access could be provided to the current or future AEMO grid. For reasons of economy, this diesel plant is likely to be recovered from abandoned mining projects at a reduced capital cost but at the risk of an inefficient plant with a high carbon footprint.

If the proponent considered that the Copi project was sustainable and had sufficient funding, there would be a high financial return from providing a PV farm and/or wind turbines at the initiation of the project.

The observation of mining projects is that many proponents make commitments towards enhancing their energy generating plant to sustainable energy at a future time. As there is no legislative requirement for this conversion the projects generally continue to operate the original diesel generating plant.

If this project was to be operating in 2035, it is difficult to conceive that it could be economically substantiable while satisfying the carbon offsets that would be required by the Commonwealth Climate Change Act at that time along with various State Energy Plans.

5. Noise Assessment

The highest noise production of equipment included in the Noise Assessment is the diesel generating plant and it has the most influence on the accumulated noise output of the various plants that generate noise.

The diesel plant has been assessed with an output of 117 dB from a combined 15 generating sets each of 2 GW. This plant has been described as silenced or insulated. Typically, this is considered as providing 18 or 20 dB of attenuation. It is unlikely that this level of an attenuation could be achieved without importing high-quality German manufactured plant.

In fact, on many days in far Western New South Wales the doors and vents of any acoustic containers will be left open to allow the plant to remain at a safe operating temperature and the acoustic attenuation will be minimal.

The generating plant is then likely to produce a relatively low frequency noise output and at a level above 140 dB, and in the quiet environment of a remote landscape with minimal masking noise this level of noise could, depending on weather conditions, become intolerable for many surrounding residents if they were to attempt to open doors or windows to ventilate their homes to reduce indoor temperatures on hot evenings. There is a demonstrated history of this unacceptable outcome at the Costerfield (Mandalay) mine site where the diesel generators are only rated at 2GW and ambient temperatures are possibly 10 degrees C lower than in the Copi environment.

6. Salt Balance

The proponent has not provided a Salt Balance report.

In each year of production, the mine will extract approximately five gegalitres of saline groundwater for the operation of the dredge and mine pit.

This groundwater is at a level in excess of twice the salinity of the ocean.

The extraction of groundwater then includes a component of up to million tons of salt on an annual basis.

Much of the saline groundwater is reported back to the mine pit as mine tailings are deposited and ultimately returned back to the groundwater system. However, dependent on operating circumstances and the weather and to achieve a balance at times, mine water and mine tailings will be stored or held in surface dams. This provides the opportunity that as mine water evaporates that a salt component can remain in storages and ultimately be transported by wind action or otherwise from the mine site.

Salt is a poison to farmland and a risk is created that ultimately through dust deposition and surface water flows that salt reports to Lake Victoria.

The consideration of salt balance could be evaluated by an examination of the nearby Ginkgo mineral sand mine which in many aspects, including the mining model, appears to mirror the proposal put forward by the Copi project.

Have the RZ Resources consultants sought to gain valuable data which is available at the Ginkgo site? (See images at the end of this document)

Where does the effected community stand?

To the effected community, the EIS process should be managed under the rules of natural justice rather than as a legal process.

It is unreasonable to expect that the effected farmers would have a reasonable opportunity to examine the ~3000 pages of the submitted documents and determine how that might affect them or interact with their farming operations within the 28-day period available for submissions.

It is also unreasonable to expect that the effected farmers would be able to garner the financial resources in such a short period of time to either source their own scientific or expert witness reports, or to fund legal representatives especially if there was the opportunity for a Panel Hearing.

As the proponent has chosen either through expedience, or incompetence, to submit documents that are variously incomplete, or inadequate, missing or misleading in some important areas such as human health risk, it would be reasonable that Major Projects do not advance the EIS until complete documents have been lodged by the proponent.

It would also be reasonable that the effected community should not be held to the constraints of the minimum number of objections requirement before they are provided the opportunity to present at a Panel Hearing.

Given the size of the farming properties/stations and the remote location of the community, the ability to garner the required number of objections to qualify for a Panel Hearing potentially places an unrealistic requirement on the community that will disadvantage their ability to defend their homes and livelihoods.

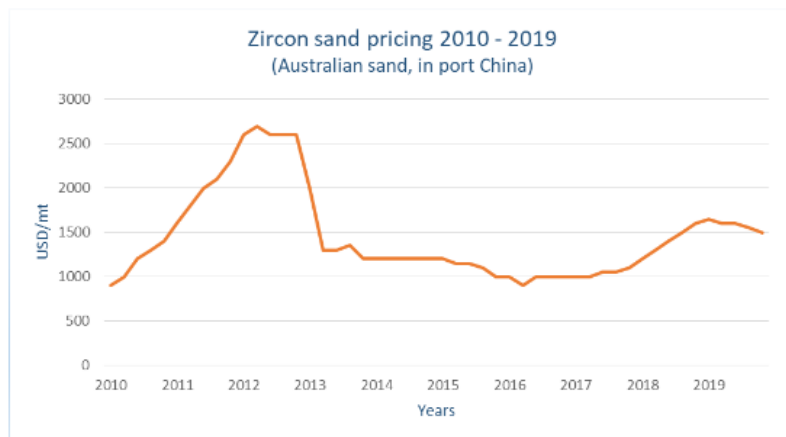
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Zircon sand is the starting raw material for the majority of zirconium chemicals and zirconium oxides

Image: www.zirconmet.com



Images: Stockpiles of wind eroded HMC



Image: RZ Resources plans to transport the mineral sands to Brisbane (Supplied RZ Resources)

<https://www.abc.net.au/news/rural/2024-06-17/rz-resources-copi-mineral-sands-project-raises-farmer-concerns/103972214>

Radiation risk

The company has submitted an environmental impact statement for public exhibition as part of the mining application process.

But a radiation health expert who has viewed the documents said it lacked important details about radiation risk.



Tilman Ruff says the statement lacks detail about [radiation](#). (ABC News)

University of Melbourne school of global health honorary fellow Tilman Ruff labelled the documents RZ had submitted "extraordinarily deficient".

"You would expect that an environmental impact statement, which really is the most comprehensive document about the project and its implications for the environment, for people, and for public safety, that it would be a fairly comprehensive overview of all aspects of the mine," Dr Ruff said.

"There's barely a mention of radiation, either for workers of the mine or for the public.

"And there are considerable possible public exposures to mine products, both in the vicinity of the mine [and along] the transport route."

Mineral sands contain trace amounts of uranium and thorium, which are radioactive.

In a statement, RZ Resources chief operating officer John Costigan said the company's environmental impact statement was a comprehensive document in accordance with NSW government requirements.

He said it outlined detailed plans to address all aspects of the proposed development, including handling of monazite, which was a critical mineral for the development of wind turbines and other renewable energy sources.

RZ Resources' environmental impact statement says the company will "obtain and maintain a range of radiation-related occupational health and safety permits and approvals and would implement stringent controls and monitoring to manage the health and safety of workers and visitors".



Google Earth Images: Ginkgo mine site



Google Earth Images: Ginkgo mine site



Google Earth Images: Ginkgo mine site