

**Submission to the application by TIGA Minerals and Metals for resource consent to establish and operate a mineral sands mine, including construction of associated infrastructure, on the Barrytown Flats. [Consent numbers WCRC: RC-2023-0046; GDC: LUN3154/23].**

#### **SUBMITTER DETAILS**

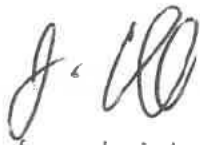
Full name: John Caygill.

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Signature of the submitter :



Name: John Caygill

Date: 28/9/2023

I wish to be heard in support of my submission. I would consider making a joint case at any hearing with others who have made a similar submission.

I am not a trade competitor for the purposes of section 308B of the Resource Management Act 1991.

I have served a copy of my submission on the Applicant as per Section 96(6)(b) of the RMA.

**SUBMISSION.** I oppose the application by TIGA Minerals and Metals, on both specific and general grounds, as follows.

#### **Specific objections.**

- The proposed mine would undoubtedly have significant adverse effects on amenity values and community wellbeing. Many residents value the quiet and relative isolation of this peaceful rural setting alongside the 'untamed natural wilderness' of the Paparoa Range. This would be significantly compromised by an industrial development of the scale proposed by TIGA, involving three bulldozers, one grader, three front-end loaders, four tool carriers, three 6WD trucks and two excavators, working in proximity to large ore stockpiles and a processing plant that is 15 metres high and 72 meters long. TIGA's plan for visual screening relies on creating earth bunds, with plantings on top which would take several years to reach their mature height and become even partially effective.
- The proposed mine would very likely have significant adverse effects on tourism: visitors from many countries come to see for themselves a coastal highway that is rated as one of the top ten scenic highways world-wide - surely one of the least appropriate places to contemplate siting a long-term large-scale industrial project.
- An extra fifty heavy truck and trailer movements a day on winding, narrow, slip-prone roads with steep drop-offs (both north and south of the proposed site), plus increased light vehicle traffic related to the mine, in total equating to a third as many extra 'equivalent car movements' a day (relative to 2018) on a highway used by a wide variety of other traffic, including cyclists who are doing a round trip on the Paparoa Great Walk/Cycleway, is surely

of greater effect than the “less than minor” concluded in TIGA’s transport assessment. This casts doubt on the judgement being exercised.

- The proposal is emissions-intensive, from diesel-fuelled trucking and open cast mining, which would contribute to the adverse effects from global warming during the current worsening climate crisis.
- The proposed mining would reduce the land elevation by around a metre, which could ultimately increase vulnerability to coastal erosion and seawater incursion into groundwater from sea level rise and storm surges in a warming climate.
- With proposed ground disturbance to depths between nine and fourteen metres, exposing mineral sands in a wet environment close to streams and a coastal lagoon, there are major hydrological and leaching contamination concerns for which the mine plan proposes to manage, monitor and mitigate at the time, but in fact may not be able to avoid or adequately remedy. Thus their toxicant management plan in response to a threshold level exceedance allows for the options of offsetting or compensating for more than minor effects, presumably if they are unable to avoid, minimise or remedy such effects. I submit that mining should cease if water quality issues cannot be fixed, rather than allowing TIGA the offset or compensate options.
- Though TIGA’s application acknowledges the light distraction threat to Westland petrels /Taiko flying to and from the nearby colonies (already a major cause of premature fatalities), and includes measures to limit further such threats from their proposed processing and transport operations, these measures may not be enough to prevent additional fatalities. These remarkable birds are present in just the one coastal locality and are already under pressure in many ways. With their slow reproductive rate, even a small number of extra deaths from light distraction can threaten the long-term viability of this species, already ‘on a knife-edge’.
- The chemical composition of the mineral sands deposit includes the radioactive elements uranium and thorium, present to a small extent in various minor mineral components such as uraninite, thorite and monazite (see Wells and Haverkamp, 2020). TIGA’s radiation assessment report states that concentration of the heavier mineral fraction of the mined material increases the detectable radioactivity, but this is so low that the HMC is “not a radioactive material for the purposes of the New Zealand Radiation Safety Act 2016.” However, this report is based on the analysis of just two samples, one of which is twenty years old and with no chain of custody. Not only does this seem inadequate, but there is also a question around the analysis itself, given that the assay of average grade material shows thorium at 31 ppm and uranium at 2 ppm, while the assay of high grade material shows thorium at 66 ppm – an expected increase, due to concentration of the material – but uranium at 0 ppm – an unexpected decrease. A research paper by Wells and Haverkamp (2020) states that: “Thorium and uranium are closely associated with each other throughout all the minerals analysed here. These elements are present in thorite where the concentration of Th and U is about equal. --- Th and U are present in the monazite at levels of 20–200 ppm for Th and 100–10,000 ppm for U ---.” (p.13). Given that the proportion of monazite in the mineral sands is estimated at 0.1 to 0.2% overall (ibid), it seems anomalous that the TIGA radiation assessment assay result for uranium in the high grade sample is 0 ppm (unless it is a very small or non-representative sample). I submit that further sampling should be carried out.
- Furthermore, TIGA have indicated that although their initial plan is to send the HMC overseas for further processing to separate-out the target minerals (ilmenite, garnet and

zircon, at this point), they are interested in doing that end-stage processing here in New Zealand. The Petroleum and Minerals assessment report (2022) on the TIGA proposal states: "The precise nature of the HMC will depend upon the processing pathway and parameters. In the application, the applicant recognises that the products will change with a raw HMC produced during the first few years of mining and separate ilmenite, garnet and zircon concentrates being produced from a mineral separation plant (MSP) after year 5. It should be recognised that the products would be further upgraded, or additional product streams produced by the inclusion of additional processing steps." (pp. 3-4). With these additional processing steps there is the possibility of further concentrating such radioactive mineral components as the monazite, thorite and uraninite, even if this is in a waste stream, and the question of radiation safety would re-emerge. I submit that this should have been addressed in TIGA's application.

Relevant to this point, it can be noted that a DSIR (Nuclear Sciences Group) report to the Minister of Energy in 1991 on "the radiological implications of the Westland Ilmenite Limited mining licence application for Barrytown, Westland" stated the following: "In the Westland Ilmenite Limited proposal it is clear that any further processing of material rejected from the ilmenite flowstream would involve thorium and uranium concentrations well in excess of the recommended notifiable product level." (p. ii). They conclude that: "Further downstream processing of the ilmenite reject material should not be permitted until the proposed new legislative framework for mineral sand mining is in place" (ibid). Although this is a different mining project from TIGA's, the ore material is the same, and concerns about the radiological implications of separating out the mineral components surely pertain to both projects.

#### **Broader objections.**

- TIGA's mining permit extends for several kilometres to the north of the current mining proposal. As the coastal strip progressively narrows northwards, and as potential future mine sites come closer to the State Highway, the Westland petrel colony, and the tourism hub of Punakaiki, it is reasonable to anticipate that the likely negative impacts of the current mining proposal would be multiplied with extended mining. This hypothetical future scenario is relevant to the current hearing on the grounds that if this initial mining proposal is approved then subsequent approval for further extensions becomes more likely - as has happened time and again with other mining operations both small and large.
- Over geological time the earth's mineral resources can be renewed, but in the historical present once they are mined they cannot be replaced. With our modern global-scale industrial regimes, we are depleting mineral reserves at ever faster rates, and becoming reliant on ever lower grades of ore, with the ever greater environmental disruption that ensues.

Mining enterprises follow market principles and the opportunity for profit, whether or not the product is strategically important (i.e. essential for life-sustaining technologies). We consume non-replaceable resources for short-term considerations of profit rather than from wider calculations of the degree of necessity for exploitation versus the long-term rational advantages of leaving finite resources in the ground until the need is great. Titanium dioxide for white pigment (in paper and paint), garnets for industrial abrasion, and zircon for ceramics, scarcely rate as of strategic necessity. The putative socioeconomic benefits from progressively mining the Barrytown Flats are outweighed by the likelihood of multiple

harmful effects on the one hand and on the other hand by the longer-term strategic benefit of keeping the minerals in the ground for the time being.

John Caygill.