

NOTES ON THE SHORT AND LONG-TERM ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS OF THE SUBMARINE TAILINGS PLACEMENT (STP) MINING WASTE DISPOSAL PROCEDURE IN REMOTE REGIONS OF INDONESIA -

A STATEMENT OF CONCERN.

This statement identifies and examines various current as well as anticipated environmental and socio-economic impacts of mining activities in Indonesia which utilize submarine tailings placement (STP) as their primary waste management procedure.

- I. In a region as oceanographically complex as Indonesia, and especially Northern Sulawesi, the argument that any assumed thermocline could act as an effective barrier against vertical waste transport is not realistic.

The region's oceanography is highly dynamic at various scales, ranging from long-term Indo-Pacific oceanic exchange to unpredictable localised upwellings. Strong deep-sea currents, complex bottom topography and oceanic islands result in powerful eddies, which can transport potential toxic wastes deposited at depth to the surface waters of coastal marine and oceanic ecosystems. This is particularly true of the extremely fine-grained silt resulting from mine tailing production.

- II. Waste and toxin re-suspension to surface through biological vectors.

According to the justification statements of several mining conglomerates operative in Indonesia, it is not anticipated that STP has any *direct surface* impact. Indirect surface impact, as well as direct and indirect subsurface impacts have not been considered thus far. Of major concern is the bio-accumulation and bio-magnification of wastes and toxins into the meso and bathypelagic food web. In those ecosystems, mining tailings can have long-term effects on deep-diving or vertically migrating marine life such as diurnal squids, fish and zooplankton. This pattern of vertical migration of marine life has the potential to maintain a continuous biological upwelling of toxins into pelagic food webs. These food chain effects can impact on numerous commercially valuable fish species including mackerels, tunas and billfish, as well as long-lived mammals such as cetaceans and humans.

The indirect surface impact of biological vectors, transporting wastes from subsurface 'placements' to productive coastal and oceanic waters is not well understood but nonetheless a significant environmental and socio-economic risk. This impact is of special relevance to Indonesia, where the deep oceanic conditions favourable to STP occur only kilometers away from island coastlines and regional communities.

III. The economical risk to local and export fisheries:

Coastal and pelagic fisheries exposed to STP are likely to suffer significant commercial losses, as real or perceived contamination of commercial target species will reduce both product value and demand.

IV. The increased human health risks:

Humans as long-lived predatory mammals are especially vulnerable to bio-accumulation and bio-magnifications in their tissues and internal organs, resulting in serious or fatal health complications. Long-lived marine mammals such as cetaceans are a potent reminder of the continued effects of toxins as they accumulate up the food chain - recently stranded sperm whales in industrialised areas are often officially classified as toxic waste and removed according to biological hazard procedures.

V. The impact of inappropriate mining procedures such as STP on numerous important socio-economic and environmental factors such as:

- Increased illegal mining activities by others attracted to the site,
- Long-term soil degradation and erosion,
- Increased run off to coastal reefs, passages and straits,
- Adverse effects on the marine tourism industry through increased sediment suspension and lowered coastal visibility,
- Reduced nature-based tourism potential through negative international publicity.

VI. The habitat degradation of meso and bathypelagic oceanic ecosystems:

STP would affect one of the Earth's least known environments - the deep tropical seas - and have a direct impact on large, spectacular and vulnerable deep sea life such as oceanic whales and dolphins, coelacanths, deep-sea sharks, leatherback turtles and bill fishes.

VII. Operational difficulties with STP

The output and risks associated with Submarine Tailings Placement waste disposals will be difficult and costly to monitor. If fully taken into account by mining companies, it would make this method the one of the most expensive waste disposal procedures. In addition, STP poses a serious environmental and human health threat when pipe breakages or other acute crises in mining waste management occur.

VIII. Conclusion

In lieu of these factors the STP waste management procedure is not considered appropriate for mining activities in Indonesia. Extraction procedures with minimal or zero toxicity combined with robust land-based waste disposal areas are needed to avoid the significant environmental and socio-economic impacts of STP mining activities.

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