Water standards help refineries coexist with healthy oceans

The challenge

Australia is one of the world's largest producers of aluminium, earning $14 billion each year from exports of ore (bauxite), refined oxide (alumina), and metal.

Refineries that process bauxite into the higher-value alumina are often built on the coast for easy access to export shipping, so care must be taken to ensure fragile marine ecosystems are not affected by pollution.

However, until recently there were no evidence-based guidelines on safe levels of aluminium and certain related metals in marine environments. That meant regulators have been very cautious regarding discharge limits.

The approach

In 2013 AIMS researchers set out to find ways to determine the actual safe levels of aluminium, gallium, molybdenum and arsenic in tropical marine ecosystems, in partnership with Rio Tinto Aluminium.

The researchers studied the effects of these metals on sub-tropical and tropical marine species ranging from single-celled algae and anemones to snail and crab larvae, using data they had gathered themselves over the course of several years alongside data from a range of other studies in the scientific literature.

Putting all the results together, they could calculate reliable, evidence-based guideline values for safe concentrations of the metals which have now been accepted by environmental regulators in the Northern Territory and Queensland.

The impact

Alumina refineries can operate with confidence, knowing that complying with the guideline values will safeguard the health of local marine ecosystems.

Our science strengthens decision-making by reducing environmental uncertainty and minimising risk.

The guideline values are also being considered for adoption in the new Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

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$14 BILLION

ESTABLISHED EVIDENCE-BASED
GUIDELINES

HEALTH OF MARINE ECOSYSTEMS
PROTECTED

ALUMINIUM REFINERIES SAFELY
IN OPERATION