PROMT: Philippines Remediation of Mine Tailings

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Tailings storage facilities at both operational and closed mines pose environmental hazards; failure could cause contaminated materials to be released, affecting people and ecosystems. On the other hand, tailings are significant resources of unrecovered metals, especially in older facilities that were produced using less efficient mineral processing. The fact that the material is already finely ground makes reprocessing of tailings appealing, but challenges here include the danger of damaging the structural integrity of the tailings by re-excavation, handling costs, and the potential for release of contaminants.

PROMT involves over 40 UK and Philippine researchers working together with mining companies in the Philippines to develop new sustainable technologies to manage Cu-Au mine tailings, to recover metals, and to make soils to support plant growth and allow the land to be reused. PROMT combines three innovative science areas:

1. Demonstrating how tailings storage facilities can be monitored in real time to allow reactive management to environmental changes, including in situ leaching. We are employing emerging technology in geophysical tomography and remote sensing to monitor and understand tailings behaviour in 4-D.

2. Investigating novel environmentally benign solvents to dissolve metals in situ from tailings, in tandem with electrokinetics to infiltrate solvents into low-permeability material. This will allow more metals to be recovered with economic value and will decontaminate hazardous components.

3. Understanding how plants and microbes colonise mine wastes and how this is affected by the use of solvents, and identifying the best ways to promote biological growth. This will not only rehabilitate the land and allow it to be reused for agriculture or wildlife, but will also minimise environmental hazards by improving the stability of the tailings and decreasing toxicity.