

The Tailings Management Partnership Agreement, a unique industry collaboration to achieve safer tailings facilities

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Extended abstract

BHP and Rio Tinto have formed a partnership agreement to accelerate the development of technologies that could significantly increase water recovery from mine tailings, reducing potential safety risks and environmental impacts associated with tailings storage facilities. In identifying cost-effective technologies for high tonnage applications (greater than 30 mpta), the focus is on reducing scale-up and implementation risks of commercially available technologies while supporting the development and demonstration of promising early-stage technologies.

The Tailings Management Partnership's governance structure includes a Steering Committee, a Commercial Working Group (dealing with commercial agreements and intellectual property management), a Technical Working Group (providing strategic guidance and technical reviews), and a Project Management Office. The initiative is supported by senior leaders, technical experts from BHP and Rio Tinto, and external consultants, notably Paterson and Cooke, PQ Partners, Red Earth Engineering, SRK Consulting, and Turner and Townsend.

Currently, two primary tasks are being pursued. The first is technical support for the engineering, start-up, and two-year operation of an extensive pilot demonstration pressure filter at a BHP copper operation. Rio Tinto has provided valuable experience from implementing smaller-scale filters for bauxite residues at alumina refineries since 2005. The second is developing a Knowledge Base to support the understanding, assessment, and future implementation of filtered tailings solutions.

The pilot demonstration installation comprises a 40 m high-density thickener, a Diemme GHT 5000F (the world's largest pressure filter), associated equipment, and a demonstration filtered tailings storage facility. The pilot aims to demonstrate reliable, cost-effective large-volume tailings dewatering, transport, placement, and geotechnical and geochemical stability. The primary long-lead equipment has been procured, and the engineering is progressing into execution. Commissioning is scheduled to start in early 2024, followed by two years of experimental operation. An experimental design program will follow to allow for the development of predictive models by testing the pressure filter over a wide range of operating conditions. This first project is expected to be followed by additional projects, although likely at a smaller scale.

The Knowledge Base has two primary components. The first is the compilation of a Technology Package for the pilot demonstration plant installation; this package will provide a detailed record of the test work performed to characterise the tailings behaviour, the engineering deliverables, commissioning and operating performance, and the predictive model. The package will provide laboratory, engineering, and operating guidance for subsequent pressure filter installations. The second component is the development of a Filtered Tailings Playbook to provide Study Managers with pragmatic guidance for implementing filtered tailings projects.

The Partnership is engaging with technology providers to establish where the initiative could support accelerated commercial deployment of tailings technologies. A technology portfolio is being compiled with

the following scope: chemical amendment to improve dewatering performance, filtered tailings dewatering and transport technologies, carbon capture, and dust mitigation.

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