

TechConnect Ventures

Sprint Challenge Brief:

Breakthrough Innovations For Treating Acid Mine Drainage

ABSTRACT

A global leader in metals extraction seeks to identify innovative and effective technologies for remediating highly acidic water runoff at mining sites. All approaches capable of generating water suitable for outcomes including reuse or discharge are of interest.

BACKGROUND

Acid mine drainage (AMD) occurs when metal sulfides, such as pyrite, are exposed to water and air during mining. The sulfides oxidize, producing sulfuric acid. The acid then interacts with surrounding rocks and minerals, releasing contaminants and metal ions like aluminum and iron into the surrounding water. This acidic flow can have negative effects on local flora and fauna as well as widespread impacts if it reaches rivers or seeps into nearby aquifers.

TechConnect's client currently remediates their AMD via lime precipitation. First, the AMD is combined with lime to significantly raise the pH of the solution and remove some of the contaminants. Secondary treatment, such as reverse osmosis, may then be used to further treat the water, depending on the nature of the contaminants present and the water quality needed for the anticipated end-use of the water (e.g. re-use at the mine site, environmental discharge, etc.) While these processes are effective, they can be energy intensive or require expensive reagents.

The client wishes to explore alternative remediation technologies at its mines in the US. There is also potential to expand usage to other locations around the globe. Potential pathways of interest include, but are not limited to:

- Alternative neutralization/precipitation approaches
- Bioremediation approaches
- Electrochemical processes
- Membrane filtration technologies

Ideally, innovations uncovered through this project will replace either the existing initial lime treatment, the post-lime precipitation process, or both. However, technologies that can enhance the performance of either process will also be considered. Proposed approaches should be suitable for real-time processing of a continuous, but variable, flow of acidic drainage, with variable chemical composition and the potential presence

of solids. Furthermore, the client is interested in environmentally friendly reagents and processes with a low carbon footprint.

Proposed approaches, for either initial treatment or secondary remediation, should possess a pathway to cost effective implementation when deployed at large scale.

The client intends to conduct pilot scale testing midyear 2024, so proposed technologies should already be in active development. Less mature technologies may also be considered in a parallel process by the client team. Approaches that focus exclusively on recovery of valuable components dissolved in the AMD are out of scope for this project. However, approaches that can demonstrate effective treatment of acidic drainage while also harvesting or recovering valuable targets are of interest.

The client team anticipates holding a virtual pitch session with select respondents, currently scheduled for April 2024. Invited respondents will have the opportunity to make a brief presentation followed by a Q&A session with the client team.

The goal of this Sprint is to facilitate contact and interactions between the Sprint sponsor and commercial entities (including startups), technology developers or research organizations/universities in this space.

REQUIREMENTS

Solvers submitting an Entry are encouraged to highlight capabilities in their Submission that meet criteria including:

- Technology Overview including
 - Consumables like reagents, membranes, etc.
 - Capacity and Scalability
 - Operational lifespan
 - Description (or images) of theoretical process flow
- Anticipated performance such as:
 - Contaminants removed
 - Proportion of water recovered
 - Energy consumption
 - Nature of waste streams
- Comparison to alternatives especially lime process
- Environmental and/or safety impacts
- Ability to participate in a pilot study
- Examples of real-world performance, if possible
- Technical maturity

BUSINESS OPPORTUNITY FOR SOLVERS

All complete and eligible Entries will be included in an exclusive Innovation Opportunity Report that will be presented to our client. Solvers with well-matched capabilities may be contacted directly by either TechConnect or the client to discuss potential partnership opportunities, including – but not limited to – demonstrations, consulting, contract research, licensing, and more. Top-rated Entries may also be invited to register or participate in an upcoming TechConnect event or pitch program.

PARTICIPATION RULES & GUIDELINES

Solvers are encouraged to review the [Rules](#) and [Guidelines](#) provided on the Sprint page for details about participation, including submission criteria, eligibility information, and more.

Please contact the University of South Florida Technology Transfer office representative for submission - Roisin McNally at rmcnally@usf.edu.