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# In-situ Amendment to FFT and Soft Tailings

## Background

The current industry practice for treatment of Fluid Fine Tailings (FFT) requires pumping this material from the tailings pond/storage area for subsequent treatment via available technologies such as thickeners, centrifuges, in-line treatment, etc. Pumping FFT from tailings pond is an expensive and sometimes challenging operation. Understanding the feasibility of in-situ treatment of FFT within the tailings pond will open up new opportunities for investing more in this area while reducing the OPEX in pumping/transportation for FFT treatment.

Currently there are some limited studies available in non-oil sands mining industries, focusing on stabilization of chemicals and solidification of tailings (e.g. [1] and [2]).

## Statement of Research Opportunity

There has not been much work conducted on in-situ amendment of FFT in the oil sands operations. It should be noted that rather than stabilization of chemicals, the focus of in-situ amendment in oil sands tailings should be on improving the dewatering and consolidation behaviour of tailings. To address this gap research should start from the preliminary

understanding of in-situ mixing and chemical injection within a FFT/soft tailings deposit.

Better understanding of the innovative tools and mixing requirements in an active and/or non-active tailings pond and injection scenarios for in-situ treatment are of interest. A suggested path forward to explore this opportunity can include the following phases:

- An experimental work conducted in a lab
- Modeling study for mixing in a tailings pond
- Understanding the impact of floating bitumen on mixing, chemical injection, and consolidation of treated FFT

## Desired Results

Below are the outcomes that are expected from this study in different phases:

- have a better understanding of the feasibility of in-situ amendment of FFT including available or innovative mixing tools and chemical injection
- understand the mixing in a tailings pond using either the existing models or developing a model
- Lab scale experimental study of this phenomenon

## Works Cited

- [1] Kiventera et al., "Solidification/stabilization of gold mine tailings using calcium sulfoaluminate-belite cement", Journal of Cleaner Production; 2019
- [2] Rachman et al., "Stabilization and solidification of tailings from a traditional gold mine using Portland cement", Environmental Engineering Research, pp. 189-194, 2018.