

Tailings Treatment And Nanoparticles

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Processing of mined oil sands will soon be producing over 150 million m³ of fluid fine tailings per year. These tailings are currently stored for later treatment and reclamation resulting in a footprint that exceeds 130 km² or 25% of the total mine footprint. Traditional tailings management has resulted in the storage of over 800 million m³ of "mature" fine tailings. MFT is a stable colloidal gel comprised of fine (20 to 40 µm) and ultra-fine clays (> 20 µm) and a broad range of organic contaminants (nano-particles) which left on its own may never solidify into a reclaimable deposit. New regulations mandate the capture of fines (e.g., ERCB directive 074) and will require innovative treatment technologies to achieve and address the resulting process water. This water inventory is expected to exceed 1 billion m³ by 2020 and contains nano-size toxic material such as fine emulsions, ultrafines, naphthenic acids, BTEX, PAHs, humate, coagulants, polymers .

The presentation will discuss emerging environmental policy, possible treatment technologies including the role of nano-technologies, expected challenges, gaps in current knowledge and the necessity for interdisciplinary research. We will present background information essential to waste water treatment of this problematic waste stream and provide an introduction to research testing combinations of standard chemical and biological treatment technologies that includes emerging advances sometimes labeled nano because they deal with these small, toxic and complicated organic compounds.

Preston McEachern, PhD

Dr. McEachern received his PhD from the University of Alberta dealing with northern hydrology and water quality. He has been with Alberta Environment for 7 years, 6 of which were with the Northern Region and now the Oil Sands Environmental Management Division tackling oil sands related issues. He has played a key role in five oil sands mine hearings and built an effective group for addressing the wide-ranging air, water and reclamation issues that challenge oil sands development in Alberta. He has participated in multi-stakeholder groups and was chairman for groups with a surface water quality focus and the principal author of the In Stream Flow Needs framework for the mine area. Dr. McEachern continues to be active in research with adjunct professor appointments at the University of Alberta in Civil and Environmental Engineering and in Renewable Resources. Dr. McEachern also lived and worked in southwest Asia, Africa and the USA. He is an avid outdoor enthusiast with a passion for mountain climbing, running and skiing.